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THE CIRCUS DISASTER AND THE HARTFORD HOSPITAL*

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An emergency anticipated and prepared for ceases to be an emergency.

IN TERMS of sudden death and human suffering, the circus fire of July 6, 1944, is the worst disaster that has overtaken Hartford in the more than three hundred years of her history. In less than fifteen minutes 125 human beings, more than half of them children under fourteen, were burned to death on the lot. One hundred and eighty-three others, of whom 150 were burned, were admitted to the various hospitals, where 43 subsequently died. Some concept of this terrible disaster can be brought to you today.

The Hartford Hospital crystallized from disaster. Ninety years ago, on March 2, 1854, a boiler blew up in the Fales and Gray Car Manufactory in Hartford, killing 19 persons and injuring 23. A coroner's jury promptly placed the blame on the carelessness of the engineer, sermons were preached on the disaster, public recriminations were openly indulged in, and a pamphlet was published and sold for the benefit of the dead and injured. Responsible citizens, however, discussed the need of preparing for a possible repetition of such a disaster, and in May, 1854, two months later, the Hartford Hospital was incorporated. From a modest beginning the hospital has grown during the last eighty-eight years to become the most heavily occupied community hospital in the United States. The physical plant became inadequate, and a new hospital was projected. In April, 1942, the citizens of Hartford pledged for the new Hartford Hospital the largest sum of money ever raised by public subscription for a hospital in the history of the world.

The most essential factor in disaster preparedness that the hospital can provide is adequate shelter for the victims. The first unit of the new Hartford Hospital, the South Building, was opened in July, 1942. Its first purpose is to serve maternity patients and their babies; but the first floor, designed to be used ultimately as an outpatient department, is constantly maintained as a properly located, adequately protected, completely equipped Triage Room, where a considerable number of casualties of any type can be assembled and definitive treatment instituted in the event of civilian disaster. An adequate drive and ambulance entrance open directly into a large foyer, where are stacked sawhorses and standard stretchers. Immediately adjoining the foyer is the Triage Room, 60 by 40 feet. Here twenty beds are kept constantly made up. At either end are lockers containing all necessary emergency apparatus. The room is equipped with utility hoppers; oxygen is piped directly into it; there is central suction; heavy-duty rubber-covered electric cables with multiple-plug receptacles placed at frequent intervals lie on the floor. Down the corridor from the foyer are two air-conditioned emergency operating rooms with complete pressure-sterilizing equipment, ordinarily used as cystoscopic rooms. Here, and in the regular accident rooms, on the afternoon of the circus disaster, the casualties were admitted and received their initial morphine and plasma, laboratory determinations were made, wounds were dressed, and ultimately the patients were transferred to the wards as these were set up to receive them.

Next to shelter and morphine, the most essential therapeutic agent in civilian disaster casualties, as in war, is blood plasma. The supply must be immediately at hand in adequate quantity. There is no substitute for blood plasma in the treatment of severe burns. The community had recognized this, and on December 15, 1941, eight days after the attack on Pearl Harbor, a proposition for a Hartford County blood-plasma bank of sufficient size and available to all the seven hospitals in the county in the event of civilian disaster was proposed to the six local Red Cross chapters. Responsible citizens accepted the proposal, and the community responded with its blood and money until a cache of 2700 pints of frozen plasma was in storage at strategic points against unexpected sudden demands of civilian disaster. So far as is known, such a cache of blood plasma contributed and paid for by a community,

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is absolutely unique. On the day of the circus fire, the blood-plasma bank paid a large dividend to the community that had had the forethought to set it up: nearly 28 gallons of plasma was injected into the veins of the victims — with only a single mild reaction. Furthermore, up to August 29, volunteers had given an additional 85 pints of whole blood to the victims at the Hartford Hospital. It is interesting to note that a large part of the plasma, blood and electrolyte given the burned patients in the hospital was introduced directly into the femoral veins. Three hundred and thirty-five recorded femoral punctures were done by the house staff during the first three weeks following the fire without an untoward incident — nor were any common femoral veins ligated. One patient, who had sixteen femoral punctures, developed a transient, benign thrombosis of the right deep epigastric vein. In no case was any vein cut down on.

As is true of nearly every other community hospital during this war, the Hartford Hospital is chronically handicapped by a shortage of trained professional personnel. But the hospital as well as the community had prepared for civilian disaster. Five hundred and eighty-five Red Cross nurses' aides had been trained and graduated since the first class was inaugurated in March, 1942. An organized group of volunteer business and professional men known as "medical aides" had been formed at the Hartford Hospital in July, 1942, to meet the crises that had developed because of the disappearance of paid orderlies into the military services and expanded war industries. So far as is known, this is the first group of such volunteer men in the country to train for this type of work. A few of these volunteers were on duty at the Hartford Hospital on the afternoon of July 6. But as the news spread, a trained community flocked to the Hartford Hospital. It came first and continuously in the uniform or dress of its own nurses, staff and employees; then, almost as the victims arrived, it appeared in every professional and volunteer category: as trained nurses, volunteers going to work on the burned cases; as Red Cross nurses' aides, 40 remaining at the Hartford Hospital and 95 being directed elsewhere for service; as male medical aides, 105 of whom reported, 30 being retained for work in the hospital and the remainder going elsewhere for emergency service; as the blue-smocked volunteers; as soldiers from Bradley Field; and as servicemen from the telephone company, who stood by all night.

Burns are a special assignment at the Hartford Hospital, and a majority of all burns routinely admitted come under the care of the Burn Committee. For the benefit of the interns on duty in the Accident Room, the Burn Committee has a typed-out plan for the definitive treatment of such burns as may be assigned to it. Within three minutes of the arrival of the first patient on the day of the disaster the director, in accordance with plans adopted by the staff and executive committee more than two years previously, declared an "emergency," which automatically placed all the disaster burns on an equal economic level and under the sole professional care of the Burn Committee. As a result, every burn that came into the hospital on July 6 was uniformly treated. The committee's typed-out plan closely follows the so-called "unorthodox method" employed at the Massachusetts General Hospital at the time of the Cocoanut Grove Disaster: immediate intravenous morphine; intranasal oxygen, if necessary; clinical evaluation of impending shock and absolute priority treatment of existing shock with plasma in adequate quantity as determined by frequently repeated laboratory checks; no cleansing or débridement of the local injury; simple protective pressure dressings, using previously prepared sterilized vaseline strips overlaid with dry gauze carefully and smoothly applied; sheet wadding rather than mechanic's waste; and Ace bandages. Folded newspaper splints are applied to extremities, with a second Ace bandage fastened to the newspaper splints with multiple safety pins. Every patient was supposed to receive intravenous sodium sulfadiazine. Each adult received 2 gm. at once, and a majority of the children received 50 mg. per kilogram of estimated body weight. Sulfonamides were entirely discontinued thirty hours after the disaster, when the National Research Council generously made an outright gift to the hospital of 220,000,000 units of penicillin, thus making it available to every victim in adequate dosage not only for therapeutic use but for prophylactic protection against possible infection.

The Burn Committee comprised three surgeons, four physicians, a pediatrician, two pathologists and adjunct members in various specialties. The day has long since passed when any severely burned patient can be considered as adequately cared for when his wound has been covered by some favorite local dressing. It cannot be emphasized too strongly that during the first forty-eight hours burns are a problem in physiologic chemistry and psychiatry; the only necessary surgical procedure in severe diffuse burns is to protect the wounds from infection and further trauma. The recognition and adequate treatment of shock is the all-important therapeutic problem; and in terrible mass catastrophes such as the circus fire severe emotional shock is superimposed on surgical shock. With this in mind, careful social-service investigation was promptly instituted in every case, and psychiatric evaluation and treatment were undertaken in a number of cases.

Fifty-one burned patients are said to have arrived at the Hartford Hospital within thirty minutes. Without the large Triage Room, previously prepared supplies, a reserve cache of frozen plasma, trained volunteer emergency personnel and uniform professional handling, the hospital would have been swamped. In all, 86 living patients were

brought to the hospital. Of these, 19 were dressed in the Triage Room and discharged as ambulatory cases. A total of 67 injured patients were admitted to the hospital, 54 of them having burns. Fortunately, a large surgical ward was in process of being painted, an overflow obstetric ward in the new South Building was not in use, and it was possible to clear other patients from the annex of a third ward. This permitted all the burned cases to be segregated; it simplified medical and nursing care, facilitated laboratory procedures and controlled visitors.

Beginning on the day following the disaster, formal rounds were regularly made at 10 o'clock each morning. All interested physicians were invited. A number of nationally known consultants were invited to come to Hartford, and they added a great deal of interest to the problems presented and discussed on these rounds. The name and the date of the expected visit of each consultant was posted in the Staff Room, and on one day there were thirty-five physicians in the group on rounds. Without exception the patients seemed to appreciate these visits; it made them feel that everything possible was being done for their safety and comfort. Each member of the Burn Committee was expected to speak to every patient as the group passed through the ward, and each consultant was personally introduced.

From the very first, visitors were admitted to the burn wards. During the first fortnight the number of visitors to each patient was limited to two and the duration of the visit to ten minutes; later the number of visitors permitted each patient and the visiting hours were extended to correspond with those on other wards in the hospital. Patients in a critical condition could be seen by members of their immediate family at any time. All physicians, personnel and visitors entering the burn wards were masked, a blue-smocked volunteer being constantly on duty at the door of each ward to enforce the rule. It is the belief of the Burn Committee that no infection was introduced or spread by this free access of professional men and relatives to the victims of the disaster, and there is a definite impression that it did much to maintain a high morale. Not a single patient asked to leave the hospital to secure different professional care, the comfort of special nursing or the exclusiveness of private-room accommodations.

As is so often the case in catastrophes, the burns followed a definite pattern. The vast majority of those who reached the hospital alive were burned solely by hot air. The vertex of the head, the extensor surfaces of the hands and forearms, the lateral surfaces of the arms, the upper back and exposed portion of the legs were uniformly the most severely burned areas. As they came into the Triage Room the victims appeared far more severely burned than eventually proved to be the case. Several had first-degree burns almost from head to foot. Shock was the outstanding feature as they came in and for the first forty-eight hours after admission. The burned patients were primarily medical cases exhibiting marked physiologic imbalance, which required the closest clinical and laboratory observation, followed by prompt, intelligent and adequate therapy. The immediate results proved the validity of this thesis: not a single burned patient died at the Hartford Hospital of burn shock — a commendable record.

Five days after the fire, at the request of the National Research Council, a group of 7 patients began to have their local wounds dressed with pyruvic acid, followed by succinic acid and early skin grafting. This group was placed under the sole direction of Dr. G. J. Connor, assistant professor of surgery at Yale University School of Medicine, who originated and developed the method. It was a most interesting study and undoubtedly will be the subject of a subsequent detailed report. The local wounds of all the other patients were treated by the standard method — a bland ointment, a massive immobilizing dressing and delayed skin grafting of third-degree areas. It is most difficult to distinguish between deep second-degree and third-degree burns during the first few days; and it was amazing how some of the burns believed at first to be of third degree filled in from little scattered viable islands of epithelium.

Three of the burned patients admitted to the Hartford Hospital died. Each came to autopsy. The first, a twenty-two-year-old woman, died fifty-nine hours after admission. The anatomic diagnoses were second-degree and third-degree burns (10 to 15 per cent of total body surface), acute membranous laryngitis and tracheitis, pulmonary emphysema (bilateral), pulmonary edema (bilateral), diabetes mellitus and tracheotomy. The second, a thirty-five-year-old woman, died six days after the fire. The anatomic diagnosis was extensive second-degree and third-degree burns (50 to 60 per cent of total body surface). The third, a sixty-five-year-old woman, died twenty-eight days after the fire. The anatomic diagnoses were extensive second-degree and third-degree burns (50 to 60 per cent of total body surface), cellulitis, left lower extremity (anaerobic *Streptococcus haemolyticus*), thrombophlebitis, left femoral vein, and operative wound (split-graft donor sites).

* * *

The circus fire as observed at the Hartford Hospital demonstrates that possible civilian disaster requires thoughtful preparation and specific organization on the part of the community, a hospital with adequate physical equipment and trained personnel and, most important of all, an organized professional staff with a clear concept of peripheral vascular failure and the significance of laboratory data, of infection and the limitations of bacterio-

static agents, of nutrition, of the underlying principles of wound healing and of realistic psychiatry.

580 Asylum Street

Discussion

Dr. Charles C. Lund, Boston: I want to compliment Dr. Wells on a perfectly marvelous job. I was one of those who had the good fortune to visit Hartford, not immediately, but about two weeks afterward, and saw the fine layout and what extremely fine work was being done.

I feel strongly, from the experience in Boston and that in Hartford, that every hospital should have typed out and ready a disaster plan, and that this plan should include a man to administer the care of burns, and probably a different man to supervise the care of certain other kinds of disasters. How do we know that this morning we may not receive in the big hospitals in Boston 200, 300 or 400 patients with any number of complicated fractures, from a train wreck right outside of, say, Readville, perhaps without any burns at all? These things are happening all the time. Owing to Civilian Defense, of course, there are such plans, but very few of them approach the one that Dr. Wells created and had ready in Hartford.

Supposing a disaster strikes, and one is faced with a problem of overloading. What should be done then? The Hartford Hospital was prepared, had plenty of room and was not overloaded. The Massachusetts General Hospital two years ago was not overloaded. The Boston City Hospital two years ago came very close to being overloaded. One hospital in Hartford, in my humble opinion, was overloaded at the Hartford disaster — both in the number of patients and in the severity of the cases. A 170-bed hospital received 100 patients. Fortunately there were 100 vacant beds. The hospital had one intern, it had a part-time staff, the staff rallied around, and they went to work.

If a patient with a fractured skull, injured in the woods of northern New Hampshire, can be safely sent to Boston, it seems possible for burn patients to be shipped promptly away from any hospital that has its load, and only after all other hospitals in the area have been put in the same position of loading should any further patients go to that hospital. This is a hard thing to do. There is a disaster and everything is in wild confusion, but the staff of a hospital should put a responsible person on the street, who, when the conditions reach a certain point, should see that incoming patients go somewhere else. Patients were transferred from this hospital to the Hartford Hospital later, and that corrected some of this overloading.

Dr. Oliver Cope, Boston: I, too, had the opportunity of going several times to Hartford and to the Hartford Hospital. I cannot overemphasize the intelligent care given by the hospital staff. It was one of those fortunate eccentricities of Fate that the circus fire should have occurred so near a hospital so well prepared.

I wish that at least part of the instructions to interns that had been drawn up by the Hartford Hospital Burn Committee could be published. There were several things of interest in them, and they were one of the reasons for the prompt, efficient care. For example, there was a description of how to do a femoral-vein puncture; I do not know of such a good, direct, simple account anywhere in the literature.

Leaving the question of management and foresight, there are other things that have emerged from the handling of this disaster by the Hartford Hospital. Doubt has recently been raised concerning the value of plasma in the treatment of the severely burned patient. There have been references to the substitution of sodium lactate solution. Anyone who had the opportunity to follow the detailed laboratory observations carried out almost hourly could have no doubt about the value of plasma in the treatment of burn shock. The data were beautifully arranged chronologically on a laboratory sheet that had been prepared for such a catastrophe.

The importance of plasma and good shock therapy is shown in relation to kidney function and damage. I visited one of the other hospitals that was less fortunately prepared in many ways and reviewed the laboratory data there. This hospital also did an excellent job in gathering information and taking care of the patients once an adequate force had been gathered. But there was a distinct difference; plasma therapy was delayed, and less of it was used. The Hartford Hospital's therapy was prompt and immediate, as it should be, and one had to search among a great number of extensively burned patients for a nonprotein nitrogen level that was above normal. In contrast, where therapy was even only moderately delayed, the rise in nonprotein nitrogen presumably due to impaired blood flow to the kidney, was dramatic. There was a striking difference in the values at the two hospitals.

There are other points, such as the control of sepsis achieved, that deserve mention in the handling of the burned patients at the Hartford Hospital. I hope that the staff will gather its information and publish it, because it will be useful to everyone in the future.

SALICYLISM ACCOMPANIED BY RESPIRATORY ALKALOSIS AND TOXIC ENCEPHALOPATHY*

Report of a Fatal Case

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THE purpose of this article is to report a fatal case of salicylism. The case is of special interest for the following reasons: the drug was given in the usual doses, as determined by symptomatic effect; the course of intoxication was directly shown, by studies of the blood acid-base balance, to be a respiratory alkalosis; tetany and electrocardiographic changes were observed; and at autopsy diffuse toxic encephalopathy was found.

The pH, whole-blood carbon dioxide content and hematocrit determinations were made as follows: Ten cubic centimeters of arterial blood was drawn into a dry syringe and immediately expelled into the cup of a Leeds and Northrup glass electrode potentiometer (No. 7661–A1 assembly), and the pH was determined before clotting occurred. The accuracy of this method is considered to be within ±0.05 pH.

Another 10 cc. of arterial blood was collected under oil in a chilled container with 10 mg. of dry potassium oxalate powder added. The whole-blood carbon dioxide content was directly determined by the manometric procedure of Van Slyke and Neill.[1] The hematocrit was determined in Wintrobe tubes after centrifuging for one hour at 3000 r.p.m. No correction was made for cell shrinkage with the anticoagulant.

CASE REPORT

I. L. (No. 6961), a 16-year-old Negress weighing 80 pounds, had been observed in the Medical Clinic over a period of several years for attacks of pain in the right lower quadrant of the abdomen. On admission to the hospital on October 18, 1940, the symptoms and physical signs of acute rheumatic fever with pancarditis were present. Briefly, the point of maximal impulse was in the 5th interspace in the anterior axillary line. A booming mitral first sound with a blowing systolic murmur and a rumbling diastolic apical bruit were heard. At the base pulmonic second sound was accentuated and palpable. A friction rub was heard over the 3rd left interspace. A high-pitched early diastolic blow was heard along the left sternal border. The lungs were clear. There was no pulsus paradoxus or peripheral signs of aortic insufficiency. No signs of chorea could be elicited. The reflexes were active without clonus.

The red-cell count was 5,940,000 and the hemoglobin 13.4 gm. per 100 cc. The white-cell count was 15,700, with 75 per cent neutrophils, 11 per cent lymphocytes, 13 per cent monocytes and 1 per cent eosinophils. The platelets appeared normal in number. The erythrocyte sedimentation rate was 11 mm. per hour, and a blood Kahn test was negative. The urine had a pH of 5.5 and a specific gravity of 1.010; it contained no albumin or acetone; microscopic examination was negative except for an occasional leukocyte. The stool was normal in appearance and negative for occult blood. The electrocardiogram showed a PR interval of 0.20 second and a heart rate of 120 per minute; there was no axis deviation o elevation of the ST segments.

Treatment consisted of bed rest, a soft diet and the administration of 1.3 gm. of sodium salicylate every 3 hours. After a total of 15 gm. had been given, the patient complained of ringing in the ears and nausea with emesis. Fifteen hours later, sodium salicylate was resumed in doses of 1 gm. every 4 hours. During this period — the 4th and 5th hospital days — the fever, pericardial friction rub and all subjective manifestations of the disease disappeared. The blood pressure was 100/60, and two white-cell counts were 8900 and 5250.

On the 6th hospital day, after a total of 26 gm. of sodium salicylate, or 0.7 gm. per kilogram, had been administered, the respirations were noted to be rapid and slightly labored. At noon, the salicylate medication was discontinued because of vomiting. The respirations soon became deep and labored. The patient was restless and tossed about the bed. The muscles were spastic and the reflexes hyperactive with sustained ankle clonus, and positive Trousseau and Chvostek signs appeared. The red-cell count was 5,520,000 and the hemoglobin 13.0 gm. The white-cell count was 6400, the hematocrit 36.5 per cent, the formol-gel test positive, and the sedimentation rate 43 mm. per hour. A specimen of catheterized urine was strongly alkaline, with no albumin, sugar, acetone or blood (benzidine test). The centrifuged specimen showed 10 white cells per high-power field and no red cells or casts. The blood urea nitrogen was 21 mg. per 100 cc. and the carbon dioxide combining power 13.0 millimols per liter (29.0 vol. per cent). At 4 p.m., 4 gm. of sodium bicarbonate was administered by mouth. By 5 p.m., the patient was unresponsive except to painful stimuli. She remained stuporous and continued to hyperventilate throughout the night.

On the 7th day, a lumbar puncture showed an initial pressure equivalent to 220 mm. of water, which fell to 150 mm. on removal of 12 cc. of clear fluid. The fluid contained 13 red cells per cubic millimeter. No leukocytes were seen. A Pandy test was negative. At that time the serum calcium was 10 mg. per 100 cc. and the inorganic phosphorus 4.2 mg.; the white-cell count was 8850, and the catheterized urine showed a pH of over 7.5. One hour after the lumbar puncture the pH of the arterial blood was 7.58, the carbon dioxide content of the whole blood 7.3 millimols per liter (16.4 vol. per cent), and the hematocrit 27 per cent. Three hours later the carbon dioxide content of the whole arterial blood was 6.7 millimols per liter (15.0 vol. per cent). From 1 to 10 p.m. the patient was given 2500 cc. of fluid intravenously containing approximately 25 gm. of sodium chloride, and at 10 p.m. was deeply stuporous. The pH of the urine was 5.5. Respirations were still rapid but shallower than before. The Trousseau and Chvostek signs were negative. Occasional twitches of various muscle groups were noted. The patient was put in a tent supplied with 95 per cent oxygen and 5 per cent carbon dioxide, where she remained until her death. During the night, in the next 7 hours, she was given a total of 0.20 gm. of morphine sulfate with the intent of depressing the respirations, without apparent effect. She was incontinent of large volumes of acid urine.

On the 8th day, the pH of the arterial blood was 7.39, the carbon dioxide content of the whole blood 11.8 millimeters per liter (26.4 vol. per cent), and the hematocrit 25.4 per cent. There were rales at the bases of both lungs, and much frothy material was aspirated from the throat. The white-cell count rose to 15,750, and the temperature gradually increased (Fig. 1). Culture of a throat swab showed no pneumococci. Sixteen hundred cubic centimeters of 5 per cent glucose

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in normal saline solution and containing 2.5 gm. of sodium sulfapyridine was administered intravenously. Twelve hours later, or 66 hours after the hyperventilation was first noted, the pulse became gradually more rapid and feeble and respirations ceased.

The time relations of significant data are shown in Figure 1.

Autopsy. Autopsy was performed 6 hours post mortem. There was gross and microscopic evidence of active rheumatic heart disease with pancarditis, and aortic and mitral valvulitis with mitral stenosis. There was chronic passive congestion of the liver and spleen and toxic changes in all the viscera. The left kidney was absent.

The gross changes encountered in the examination of the brain were confined to patchy subarachnoid effusions of blood, with small perivascular hemorrhages in the region of the 3rd ventricle and occasionally in the inferior portions of the basal ganglions. Congestion was observed throughout the basal ganglions, substantia nigra and pons and in the floor of the 4th ventricle.

Microscopic examination revealed a generalized swelling and slight chromatolysis of all the nerve cells in the cortex, basal ganglions and brain stem, associated with areas of severe nerve-cell degeneration, scattered particularly in the pyramidal layers of the cortex, basal ganglions and substantia nigra, and to a lesser degree in the nuclear masses of the brain stem. Small perivascular areas of early rarefaction were observed in the deeper layers of the cortex and in the basal ganglions. Hemorrhage and nerve-cell degeneration were most marked in the paraventricular nuclei and in the region of the 3rd ventricle. Many small vessels there and in the cortex contained hyaline thrombi, and in patchy areas in this region, as well as in the basal ganglions and brain stem, the capillaries exhibited moderate endothelial hyperplasia and were generally increased in numbers. The microglia was also increased in many of these areas, and the oligodendroglial cells were swollen throughout and markedly increased in the subcortical white matter and internal capsule. Satellitosis was marked in some areas of the cortex and basal ganglions, with aggregations of these cells around blood vessels in the distended perivascular spaces. The large nerve cells were markedly diminished in the globus pallidus, and a scattered gliosis was observed throughout the basal ganglions, under the ependyma of the lateral and 3rd ventricles and in patchy areas in the deeper cortex.

No organisms were observed with the bacterial stains.

The anatomical diagnoses were as follows: active rheumatic myocarditis; aortic and mitral valvulitis; pericarditis; mitral stenosis; and nonspecific toxic encephalopathy.

Comment

Quincke[2] in 1882 reviewed the fatal cases of salicylate poisoning following its introduction into medicine a few years before. He believed that dyspnea was characteristic of intoxication and that it was central in origin, because of the autopsy finding of cerebral congestion in his single fatal case. Hurtley and Trevan[3] in 1916 showed that decerebrate cats with the corpora quadrigemina intact hyperventilated on injection of 0.2 gm. of sodium salicylate per kilogram, whereas if the section was made below the corpora quadrigemina, the response to injection was apnea, followed by resumption of the normal respiratory rate. Veil and Graubner[4] in 1926 showed that the drug had a uniform central stimulating effect in normal subjects, since all persons showed lowering of the alveolar carbon dioxide tension, increase in the pH of the urine and lowering of the urinary ammonia excretion. Gebert[5] in 1931 confirmed these results in a similar fashion, noting in

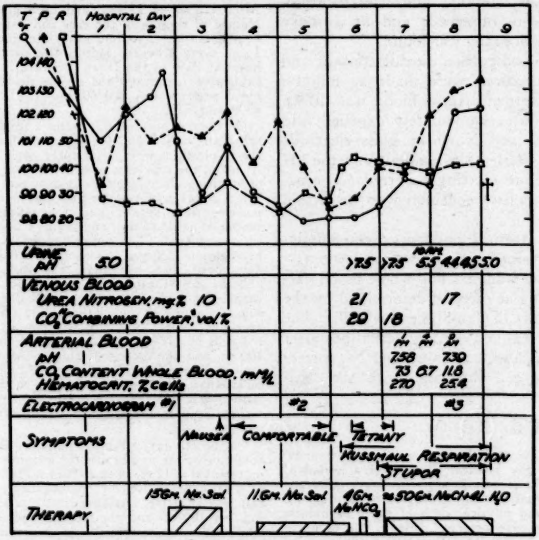

FIGURE 1. *Time Relations of Significant Data.*

addition the increased calculated pH of the arterial blood, even though there was no detectable clinical change in the breathing with the given doses of 5 to 6 gm. Odin[6] and Dodd, Minot and Arena[7] gave excellent discussions of the problem and made similar observations. They each reported several cases of clinical intoxication, although these cases do not conclusively demonstrate the presence of a respiratory alkalosis because of secondary compensatory factors. We have found no complete reports of the course of the acid-base changes in poisoned patients, but Guest and Rapoport[1] have noted an increase

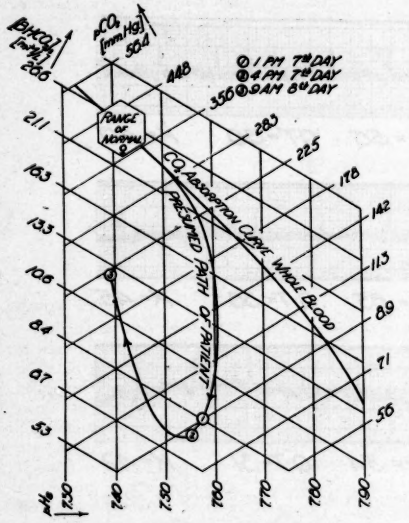

FIGURE 2. *Acid-Base Balance Plotted on Trilinear Co-ordinates (after Shock and Hastings[20]).*

The values for pCO_2 (carbon dioxide tension) and ($BHCO_3$)s (serum base bicarbonate) at points (1) *and* (3) *were calculated from the pH and carbon dioxide content of the whole blood and hematocrit by the Shock and Hastings nomogram.[21] Point* (2) *was approximated from the assumption that the observed decrease in carbon dioxide content of the whole blood was associated with a slight fall in pCO_2. The normal values given are those of Shock and Hastings[22] and agree with our experience. The line marked "CO_2 absorption curve of whole blood" was approximated from the data of Van Slyke, Wu and McLean[23] on oxygenated horse blood with approximately the same HbO_2 (13.4 vol. per cent) as that of the patient (14.9 vol. per cent).*

in the pH of the venous blood of patients suffering from salicylate intoxication and have since found a similar rise as the result of controlled salicylate administration.

In the present case, the direction of the changes in the pH of the arterial blood and the carbon dioxide tension, together with the changes in urinary pH, indicate a primary respiratory alkalosis (Fig. 2).

The magnitude of these changes resulting from hyperventilation is striking, since the literature reveals no such low values attributable to a primary respiratory alkalosis. Equivalent changes in the carbon dioxide tension have, however, frequently been recorded in salicylate intoxication. In this case, partial correction of the abnormal acid-base balance following administration of saline solution and a return of the blood pH to normal value were not associated with any detectable improvement in the clinical condition.

In view of the finding at autopsy of a diffuse toxic encephalopathy, it appears that the hyperventilation, which was central in origin, and death were related to the encephalopathy. Whether this encephalopathy was caused by the toxic effects of salicylate or by the rheumatic process itself cannot be directly proved, but there is considerable evidence that salicylism was the cause of the acute changes. The onset of the fatal symptoms occurred following the administration of rather large doses of salicylate and during a period when the rheumatic manifestations had completely subsided. Although the dose of salicylate was within the usual therapeutic range, it was definitely above the mean toxic dose for women, according to Hanzlik.[9] Toxic and fatal manifestations with both larger and smaller doses than were given this patient have been described.[5, 10] Furthermore, this patient exhibited the classic symptoms of salicylate intoxication, namely, severe hyperpnea and a low carbon dioxide tension of the blood; also, the brain changes in this case are similar to those of the few autopsied cases reported in the literature.[11] Since the patient was suffering from subsiding rheumatic fever, it is, of course, possible that the encephalopathy was a part of the rheumatic process. This was the interpretation of Dobbs and de Saram[12] in their report of a patient who followed a very similar course. The encephalopathy of rheumatic fever has recently been studied by Winkelman and Eckel[13] and by Alpers.[14] Pathologic changes in the brain of the type seen here were reported in 1922 in a case of rheumatic fever by Greenfield and Wolfsohn,[15] who briefly discussed the literature up to that time. Hyperpnea was extreme in their case, but they do not state whether the patient was receiving salicylate.

Apparently the differential diagnosis of chorea, rheumatic encephalopathy and salicylate encephalopathy cannot be made through a morphologic investigation. In this case, however, the time relations of the course of the acute rheumatic fever and the salicylate therapy, the clinical rarity of severe encephalopathy as a complication of acute rheumatic fever and its apparent — although largely unrecognized — frequency as the end stage of salicylate intoxication all strongly suggest that salicylate intoxication was the cause of the fatal encephalopathy. Tetany developing in the course of salicylism has also been observed in 2 cases by Bergmark in his discussion of Odin's[6] paper.

Of further interest are the changes in the Q–T interval in the electrocardiogram (Fig. 3). The interval became prolonged to the upper limits of normal when tetany was present and the pH of the blood was high, but returned to its original average normal value during the period of compensation when tetany had disappeared and the pH had fallen to within normal limits.[16] Such changes in the Q–T interval in the absence of marked myocardial failure have usually been found in disorders associated with hypocalcemia and with respiratory and metabolic alkalosis.[17–19] The serum calcium in this case was normal. Barker, Shrader and Ronzoni[19] noted flattening of the T waves in respiratory and metabolic alkalosis, a finding also present in this case.

The findings in this case, together with the literature cited, do not support the widely held belief that salicylate intoxication is an acidosis.

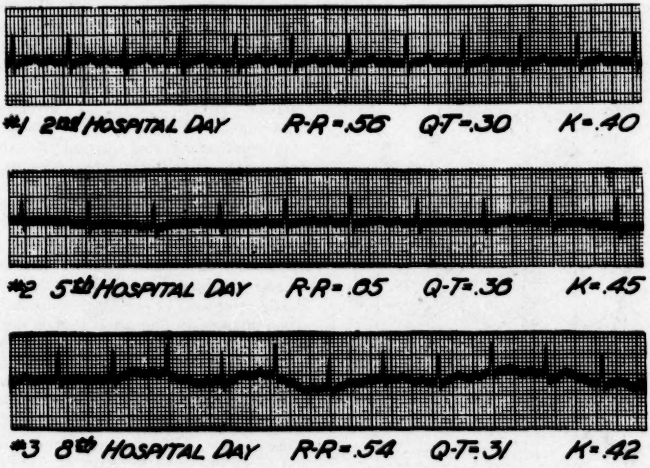

FIGURE 3. *Serial Electrocardiogram Showing the Changes in the Q–T Interval during the Alkalosis (fifth hospital day).*

Lead 1 is reproduced and not Lead 2, as suggested by Shipley and Hallaran,[24] because T_2 was isoelectric on the fifth hospital day; K is Bazett's cardiac index.[25]

SUMMARY

A fatal case is recorded in which a primary respiratory alkalosis of extreme degree was conclusively demonstrated following salicylate administration.

The finding is in accord with acceptable data in the literature that indicate that the usual toxic effect of salicylate in any form is central respiratory stimulation. Partial correction of the acid-base balance caused no detectable improvement in the clinical condition.

Secondary manifestations of primary respiratory alkalosis — that is, tetany, prolongation of the Q–T interval and flattening of the T waves in the electrocardiogram, the secretion of alkaline urine during the development of the alkalosis and acid urine during its regression, and compensatory reduction of fixed base with lowering of the alkaline reserve — are recorded.

At autopsy a severe diffuse encephalopathy of the toxic type was found and described in detail.

The relative importance of the salicylate therapy and the acute rheumatic fever in the development of the encephalopathy is discussed.

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MEDICAL PROGRESS

ENDOSCOPY (Concluded)*

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BOSTON

ESOPHAGOSCOPY

Benign Tumor

Harrington and Moersch[34] regard benign tumors of the esophagus as potentially malignant, and point out that extensive operative procedures may be required for their removal. They are divided into two main groups: mucosal and extramucosal tumors. The mucosal tumors are often pedunculated and arise from the submucosa. They are usually fibrolipomas or fibromyxomas and are covered by normal epithelium of the esophagus. The extramucosal or intramural tumors arise from the muscle of the wall of the esophagus; they do not involve the mucosa and are usually leiomyomas. The growth of benign tumors of the esophagus is slow, and they may attain considerable size without giving rise to subjective symptoms. This is particularly true of the intramural tumors, which rarely produce obstruction of the esophagus unless they attain great size. The symptoms generally associated with these growths are dysphagia, substernal pain, regurgitation of food, cough and dyspnea. Pedunculated tumors are usually associated with obstructive symptoms, and the diagnosis of these growths is often definitely established by regurgitation of the tumor into the mouth, which may be the first subjective symptom. Regurgitation of these growths into the nasopharynx can imperil life owing to blocking of the trachea, which may result in strangulation. The roentgenographic and roentgenoscopic examination of the esophagus is of great value in determining the presence of these growths. Esophagoscopic examination is of the utmost importance in establishing a definite diagnosis, although at times it may be difficult to determine the site of origin as well as the type of growth because of the difficulty in obtaining a specimen for biopsy through the normal esophageal mucosa. The site of origin of the pedunculated tumors can usually be definitely determined. The indications for surgical treatment of benign tumors are not so urgent or so imperative as those for malignant lesions of the esophagus. They depend somewhat on the patient's general condition, the amount of difficulty the tumor is causing and the site of the tumor. Inasmuch as such growths may undergo malignant change, these authors state that surgical treatment should be considered in all cases.

Carcinoma

Bersack[35] has reported a case of carcinoma of the esophagus in association with achalasia of the cardia. He is of the opinion that unless careful and repeated esophagoscopies are resorted to, carcinoma is rarely detected early in patients suffering from achalasia. No sharp change in the symptoms marks the appearance of carcinoma, especially when it is located high in the esophagus. This is so mainly because there is no interference with the passage of food. Even at the late stage at which cancer was detected in Bersack's case, no obstruction to the passage of the esophagoscope was encountered. Furthermore, small irregularities and

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filling defects in the dilated esophagus are often caused by, and are readily attributed to, retained secretion and food particles. In the case that Bersack reports the patient had suffered from a stricture of the cardiac end of the esophagus for ten years. The history revealed that she had been treated with dilatation, which had improved her condition for about five years. For the last four years, the patient regurgitated part of the food and found that food got stuck in the "pit of the stomach." The general condition was fair, and no anemia was present. The roentgenologic examination revealed a carcinoma in the middle of the esophagus and achalasia. The author stresses the fact that this was the first case among 227 cases of carcinoma of the esophagus that was preceded by achalasia. Since both conditions have a similar history, the author emphasizes the importance of an extremely careful examination.

In discussing carcinoma of the esophagus, Bird[36] stresses the importance of doing both esophagoscopy and bronchoscopy preoperatively, the object of the bronchoscopy being to demonstrate whether the lesion has extended into the trachea or left main bronchus in which case the lesion is definitely inoperable. Strieder[37] and Garlock[26] agree that preoperative bronchoscopy is of great importance in determining the operability of carcinoma of the esophagus.

Benign Stricture

The management of benign stricture of the esophagus is a delicate problem. The dangers of blind bouginage cannot be too frequently emphasized. Eloesser[38] recalls the case of a benign lye stricture of the esophagus treated by blind bouginage by a local physician. The sound was apparently passed effectually, but still no food got into the stomach through the esophagus. The bouginage had been done some months previously without any obvious deleterious effects. When Eloesser opened the abdomen he found that the sound had been forced down retroperitoneally as far as the sacrum. On opening the chest, he of course found a fistula. Proceeding from there he was able to get a large bougie up into the mouth, and a large bougie was then introduced into the stomach from the upper esophageal segment.

Adams and Hoover[39] state that as a sequel to the treatment of carcinoma of the stomach by total gastrectomy and esophagojejunostomy in 68 patients, 6 of them developed a partial stricture at the anastomosis within a few weeks or months after the operation. All responded to repeated dilatations using a swallowed thread as a guide. The technic of successfully traversing a complete occlusion 2 cm. in length of the midthoracic esophagus by combined peroral esophagoscopy, retrograde esophagoscopy and mediastinotomy is described.

Cardiospasm

According to Adams and Hoover[39] rapid dilatation with a modified Plummer bag in 2 cases of cardiospasm led to suppurative mediastinitis that required prompt surgical drainage. Both patients recovered. The authors were convinced that such rapid dilatation was too dangerous for further use. Henceforth, they intend to follow their former policy of gradual dilatation, accepting the inconveniences of slow dilatation and the time required rather than risking esophageal rupture. Leakage occurred in one case under general anesthesia, which was given at the insistence of an extremely nervous and temperamental patient. In addition, too great pressure was used. This complication must be classified as secondary to an error in judgment, since the pain reflex should be preserved as a safeguard during esophageal dilatation for cardiospasm.

Another complication of cardiospasm has been discussed by Gray and Jankelson[40] namely, inhalation pneumonitis resulting from overflow of food or secretions from the esophagus into the trachea. This pneumonitis may be either of the recurrent acute type or of the chronic type with acute exacerbations. The alleviation of the cardiospasm by bouginage improves the general condition and contributes to the cure of the pneumonic process. It is recommended that the esophagus be investigated routinely in all cases of etiologically obscure chronic pneumonitis or recurrent acute pneumonia.

Garlock[26] emphasizes the importance of esophagoscopy in cardiospasm. The finding of a smooth conical obstruction at the lower end of the esophagus in the x-ray picture does not necessarily indicate a benign cardiospasm. Esophagoscopy must be carried out. Negative esophagoscopic findings do not exclude completely the presence of a cardial carcinoma. Repeated endoscopic examinations are indicated if the symptoms persist. No patient should be subjected to operation unless the biopsy specimen obtained by esophagoscopy shows carcinoma. It must be emphasized that the care of a patient with cancer of the esophagus is a co-operative problem requiring the concerted efforts of the roentgenologist, esophagoscopist, anesthetist, operating room staff, bedside nurses, physician and surgeon. Even under the most ideal conditions, the operative mortality is relatively high if the surgeon does not practice careful selection of his operative material.

In discussing the respiratory complication of achalasia of the cardia (cardiospasm) with megaesophagus, Hurst[41] states that it is not generally recognized that symptoms may arise from pressure by the distended esophagus or from aspiration of regurgitated food. In 1 case reported, sudden death occurred from asphyxia.

Hysterical Dysphagia

Gaarde and Olsen[42] have classified the causes of dysphagia in the upper part of the esophagus. In discussing functional conditions, they distinguish between hysterical dysphagia and functional dysphagia. They regard hysterical dysphagia as a well-defined clinical syndrome that affects elderly women with anemia and is usually accompanied by loss of weight and nutritional deficiency. It is ordinarily referred to as the Plummer–Vinson syndrome. The cricopharyngeus muscle fails to relax and allow passage of food. An esophageal web frequently occurs just below the level of the cricopharyngeus muscle. This web consists of fibrous strands that traverse the esophageal lumen. Whether iron-deficiency anemia or psychic trauma is the antecedent factor in these cases is difficult to determine. The dramatic relief of dysphagia produced by the passage of an esophagoscope or dilating sound suggests that a cure is effected by release of cricopharyngeal spasm, dilatation of any organic stenosis present and the restoration of the patient's confidence in his ability to swallow. The subsequent administration of iron and vitamins should result in permanent relief of symptoms. Attention is called to the frequency with which carcinoma develops at the esophageal introitus in cases of the Plummer–Vinson syndrome.

Functional Dysphagia

Functional dysphagia, on the other hand, according to Gaarde and Olsen[42] is less clear cut than is the Plummer–Vinson syndrome. Emotionally unstable patients of either sex are likely to complain of difficulty in swallowing. Fear of choking is often the most prominent symptom, and these patients may have equal difficulty in swallowing liquid and solid foods. The diagnosis of functional dysphagia may be dangerous. When dysphagia referable to the hypopharynx or upper part of the esophagus affects a psychoneurotic patient, it is a general practice to make a diagnosis of functional dysphagia. Unless esophagoscopic examination is carried out, errors in diagnosis may readily occur. Organic lesions of the upper part of the esophagus may be confused with functional dysphagia.

Myasthenia Gravis

Blalock,[43] in a discussion of thymectomy in the treatment of myasthenia gravis, states that 14 of 20 patients studied complained of difficulty in swallowing. This disease must therefore be considered in patients with dysphagia. Other more frequent causes of dysphagia must be excluded by x-ray and esophagoscopy. The neostigmines (Prostigmin) test is helpful in the diagnosis. The preoperative neostigmine requirements of these patients varied from 75 to 910 mg. daily. Death in 1 case following thymectomy was due to atelectasis and respiratory failure. In this case Blalock believes that bronchoscopy and aspiration were definitely indicated. In summarizing the results of thymectomy, performed on 20 patients with severe myasthenia gravis during the last three years, Blalock states that a benign thymic tumor was found in only 2. Four of the patients have died since operation, 3 of the deaths occurring in the early postoperative period. Of the 16 remaining patients, 3 are essentially well, 5 are considered improved, 5 are moderately improved, and 3 have shown little if any improvement. All the 16 surviving patients expressed the opinion that the operation had been helpful.

Peptic Ulcer of the Esophagus

It has been noted by Adams and Hoover[39] that a large percentage of patients with peptic ulcer of the lower end of the esophagus have a short esophagus and a small diaphragmatic hernia.

Lust and Peskin[44] have studied the roentgenologic diagnosis of peptic ulcer of the esophagus, stating that without doubt diagnoses are most accurate when made by direct visualization of the process. Esophagoscopy, however, is a procedure that causes great discomfort, and it should be performed only by those skilled in its technic. Lust and Peskin believe that careful roentgenologic examination can demonstrate the lesion with sufficient accuracy. I take exception to this statement, believing that in any case of narrowing or ulceration of the esophagus, esophagoscopy and biopsy must be performed to exclude carcinoma; esophagoscopy and bouginage may also be necessary for therapeutic purposes. In skilled hands, with a reasonably co-operative patient, the procedure is not one of great discomfort.

Experimental Peptic Ulcer of Esophagus

Brown[45] fed white rats a long-continued, vitamin-deficient, rice diet and noted frequent lesions of the esophagus consisting of focal ulcerations of the mucosa, with penetrating inflammation, mucosal hyperkeratosis, edema of the submucosa, atrophy and fibrosis of the muscularis and dilatation of the organ. After the administration of synthetic vitamins, the rats gained in weight, the ulcers largely healed and the autopsied animals showed practically no lesions in the internal viscera. The authors concluded that the lesions noted in these animals appeared to be of dietary origin.

Spontaneous Rupture of Esophagus

Collis, Humphreys and Bond[46] report the spontaneous rupture of the esophagus after a heavy meal occurring in a man forty-one years of age with a previous history of dyspepsia. This condition should be kept in mind when doubt is felt about the diagnosis of perforated peptic ulcer. Deep emphysema in the neck is an important physical sign. Suturing

of the tear in the esophagus, combined with drainage of the pleural cavity on the affected side, offers the best chance of recovery.

Gastroscopy

Instruments

Hardt[47] has described a new flexi-rigid gastroscope consisting of two parts, a flexible sheath and a removable interior consisting of a rigid optical system comprised of approximately twenty-five optical elements. The optical system is inserted into the sheath when the latter is in place in the stomach. Hardt claims that the advantages of this gastroscope are an increased angle of visualization, a larger image, diminution in the blind-spot areas, a better view of the antrum and less gagging by the patient.

Equen[48] describes a new magnet for removing foreign bodies in the food and air passages. The magnet is made of cast Alnico and is attached to a Levine tube, through which a metal stilet has been inserted to increase the motility of the tube. The other end of the Levine tube is attached to a rubber bulb, this apparatus being used for inflating the stomach. In the case reported, a bobby pin was successfully removed from the stomach of a nineteen-month-old baby under fluoroscopic visualization. The entire procedure lasted only eight minutes.

The whole foreign-body problem would be greatly simplified if patients vomit foreign bodies as easily as occurred in the case reported by Benedict.[49] In this very exceptional case, a three-year-old child swallowed an open safety pin a few minutes before entering the Emergency Ward. A few hours later, the patient vomited and the pin was recovered. It measured 2.7 cm. in length. The reason it was vomited so readily was that the point was bent toward the keeper.

Gastritis

Renshaw[50] believes that the principal value of gastroscopy lies in the diagnosis of gastritis. With rare exceptions gastroscopy is the only clinical means for establishing this diagnosis. Although the true significance of the mucosal changes noted gastroscopically has not been definitely settled, chronic gastritis undoubtedly is a definite entity, which at times produces severe symptoms. A small percentage of cases of unexplained massive hemorrhage from the upper gastrointestinal tract have been shown to be due to chronic gastritis. Renshaw quotes Bockus as stating that unquestionably the flexible gastroscope is opening up new diagnostic channels.

Benedict[51] has written a review of gastroscopy. He concludes that gastroscopy with the flexible gastroscope is an easy and safe procedure, the value of which cannot be doubted. Attention is called to the omni-angle feature and the controllable flexibility of certain instruments. The simpler technics, including 4 per cent cocaine gargle and small pillows for head support, are preferred to more complicated methods. The indications for gastroscopy are outlined. He states that no stomach that is producing symptoms should be considered normal without gastroscopic study and that the significance of hemorrhage in gastritis has been demonstrated by gastroscopy. Gastroscopic and pathologic findings in gastritis are correlated. The usefulness of gastroscopy in cases of gastritis, ulcer and tumor is critically considered.

Meyer and Steigmann[52] have discussed the surgical treatment of corrosive gastritis. They state that dysphagia appears oftener and sooner after the ingestion of an alkaline corrosive (lye) than after that of an acid. In fact, in most cases of corrosive gastritis due to an acid, the patients presented themselves not because of dysphagia but because of symptoms of gastric obstruction. Corrosive gastritis may be confused with gastric carcinoma, not only because of the suggestive appearance of the x-ray films but also because of symptoms of continuing vomiting, marked weight loss and achlorhydria. The importance of differentiating the two conditions is obvious from the point of view of treatment, as well as from the point of view of prognosis. Gastroenterostomy may be done rather than resection inasmuch as the dangers of gastrojejunostomy are minimal, since in these stomachs there is no free acidity.

In a study of peptic ulcer, gastritis and psychoneurosis among naval personnel suffering from dyspepsia, Montgomery, Schindler, Underdahl, Butt and Walters[53] studied 45 unselected patients, finding 23 cases of duodenal ulcer and 22 cases showing no ulcer. In 11 of the latter the gastric mucosa proved to be entirely normal gastroscopically, but in the remaining 11 cases there were varying degrees of hypertrophic, superficial and atrophic gastritis. In 11 cases, there was a definite psychoneurosis of the anxiety and mixed types sufficiently severe to necessitate discharge from the service. In summarizing the differential diagnoses in this group, it is interesting that among these 22 cases there were 11 in which the diagnosis was made by psychiatric approach. In the other 2 neither psychiatric, gastroscopic nor any other study afforded a satisfactory diagnosis.

In a comparison of the radiologic and gastroscopic findings in 200 dyspeptic soldiers, Guyer[54] states that the reason for the discrepancies between them is not difficult to determine. The radiologist examines the stomach as a whole, his diagnosis resting on the estimation of function, with an examination of the coarser anatomic details. The gastroscopist, on the other hand, is in a position to examine closely the changes in the mucous membrane, seeing the early inflammatory changes that may be taking place, as well as ascertaining the

more obvious organic lesions, such as ulceration and malignant change. In the study of the duodenum, radiology so far stands supreme, and any changes seen in the stomach by the gastroscopist are merely corroborative and not diagnostic, since the duodenum is at present inaccessible to him. In cases in which radiology has failed to elicit any cause in a complaint of a dyspeptic nature, gastroscopy is of great assistance, mainly in the diagnosis of gastritis, since in this disease the gastroscopic findings are considerably more helpful than is radiology. Two other types of case offer considerable scope for the combination of the two methods of examination, — cases of healed or healing gastric ulcer, which has passed beyond the stage where it was possible to demonstrate it radiologically, and cases in which there is a question of early malignant disease but in which the organic changes are sufficiently marked to allow radiologic demonstration. Gastroscopy in the armed services has obvious limitations. It is considered of use in patients constantly reporting sick with dyspeptic symptoms when all other forms of investigation have been negative. The demonstration of gastritis in a case of this type is important to facilitate the patient's treatment or disposal. Two hundred cases of dyspepsia in serving soldiers were examined radiologically and gastroscopically. Both types of diagnoses are discussed separately, and the combined findings of the two methods are analyzed. The conclusions reached are that the two investigations are complementary to each other, but that in the study of gastritis, gastroscopy gives more valuable information than can be obtained by radiology.

Scheff, Horner and Kenamore[55] believe the incidence of gastritis in patients with duodenal ulcer, as determined by gastroscopic examination, is higher when the ulcer is complicated by pyloric obstruction. Eighty-six per cent of patients with duodenal ulcer and obstruction showed the mucosal changes of superficial gastritis, whereas 62 per cent of the nonobstructed group gave similar findings. Severe gastritis was found six times more frequently in the stasis group. It appears that retention of gastric contents is associated with inflammatory changes in the gastric mucosa.

Warren and Meissner[56] are of the opinion that in the severe stages of chronic gastritis the epithelium assumes alterations that are entirely comparable to well-recognized premalignant lesions in the cervix, breast and skin. The most important of these changes are the presence of atypical cells and atypical glands and increased mitotic activity. Only the severe stage of chronic gastritis with these marked epithelial alterations shows the necessary criteria for premalignancy; the mere presence of mucosal infiltration by inflammatory cells and of slight alterations of the epithelium is not sufficient. These authors conclude as follows: chronic gastritis is a labile condition that may regress and that need not necessarily progress; not all stages or types of chronic gastritis can be considered to be precancerous; the histologic changes in chronic gastritis should be divided into exudative and epithelial, the former having no direct significance as a precancerous lesion; when epithelial changes become severe, they may be comparable to well-recognized premalignant lesions elsewhere in the body; and since one stage of chronic gastritis meets the necessary criteria for a precancerous lesion, it may be assumed that some gastric cancers arise on this basis.

Gastric Ulcer

In discussing the treatment of gastric ulcer, Counseller, Waugh and Clagett[57] note that they are operating more frequently on gastric ulcer than formerly. The lesions that are not immediately treated surgically are treated medically in the hospital. If the ulcer becomes smaller or disappears, as determined roentgenologically and by gastroscopic examinations, and if occult blood disappears from the stools, medical management is continued. Periodic examinations are strongly advised. When this type of response is not obtained by medical treatment, patients are advised to have surgical treatment at once.

Carcinoma

As regards carcinoma, Counseller, Waugh and Clagett[57] believe that the general trend of medicine is toward a more and more complete examination, and since early carcinoma can be visualized either at the time of roentgen-ray examination or through the gastroscope or both, it is probable that the more frequent use of these procedures in the future will increase the operability rate of carcinoma of the stomach.

Palmer and Humphreys[58] discuss 4 cases of peptic ulcer and healing in gastric carcinoma. In all of them, the duration and history were compatible with primary ulcerating neoplasm and gastroscopic evidence of neoplastic infiltration was found at the first examination. In discussing these cases Fitzgibbon reported the case of a penetrating ulcer crater that filled in gastroscopically after eight months of treatment so that the bottom could not be seen. At the end of three and a half months, the lesion was completely covered by mucosa. Surgery had been advised but refused. A few months later, symptoms recurred. Gastroscopy and x-ray examination both showed carcinoma, but the lesion was inoperable, since liver metastases were present.

Lymphosarcoma

Paul and Parkin[59] made gastroscopic observations on a patient with lymphosarcoma of the stomach. From the standpoint of visualization of the lesion with the gastroscope, they do not believe

that there were sufficient features to permit identification of the lesion as a lymphosarcoma. The consensus in current radiologic literature is that there are no positive diagnostic points on roentgen-ray examination.

Gastric Diverticulum

Whitehouse and MacMillan[60] believe that gastroscopy is helpful in the diagnosis of diverticulums of the stomach. They believe that one can evaluate the size of the opening more accurately by means of the gastroscope, since the stomach is inflated and the diverticulum ballooned out. In 2 cases reported, they were able to see the interior of the sac almost completely and considered this of value in ruling out an ulcer or tumor in the diverticulum.

Peritoneoscopy

According to Benedict,[61] one of the chief uses of the peritoneoscope is in the diagnosis of liver disease. When one considers that many of these patients are seriously ill and that in most of them an exploratory laparotomy is out of the question, the value of a precise diagnosis by peritoneoscopy is apparent. The cases referred for peritoneoscopy because of liver diseases usually fall into one of the following groups.

Metastatic carcinoma. In this group there is a positive or presumptive clinical diagnosis of carcinoma of the breast, bronchus, esophagus, stomach, pancreas, colon, rectum, prostate or the like, and before planning medical, x-ray or surgical treatment, it may be of great importance to know whether or not there is metastatic disease in the liver.

Hepatomegaly. Is one dealing with metastatic or primary carcinoma, cirrhosis, hepatitis, sarcoma, echinococcal cyst, polycystic liver or some other liver disease?

Ascites. Is this due to cirrhosis, carcinoma or tuberculous peritonitis?

Jaundice. Is the diagnosis toxic cirrhosis, biliary cirrhosis, malignant neoplasm, hepatitis or some other infectious process?

Doubtful clinical findings. What is the precise diagnosis?

In conclusion it is stated that peritoneoscopy is an important and well-established method of examining the peritoneal cavity that is especially applicable to the differential diagnosis of liver disease. With biopsy, a suspected diagnosis is made positive. In a series of peritoneoscopies in 435 patients, the examination was undertaken primarily to study the liver in over two thirds of the cases. One hundred and seventy patients were found to have metastatic carcinoma, 73 had cirrhosis, and the remainder had various diseases, including hepatoma, sarcoma, lymphoma, lymphangioma, Banti's disease, cholangitis, polycystic liver, echinococcal cyst and sarcoid.

Wershub[62] also finds the peritoneoscope of great value in the diagnosis of liver disease, concluding as follows. The peritoneoscope has specific indications for its use, and is especially applicable to the diagnosis of liver disease. The indications previously expressed are definite and in some cases offer the only means, other than exploratory laparotomy, for diagnosis. The diagnosis of portal cirrhosis, which so frequently cannot be accurately determined clinically, can be made with 100 per cent accuracy by the peritoneoscope. In other hepatic disorders, the endoscopic impression may confirm or establish a diagnosis.

Mensh and Hanno[63] have discussed a case of hepatoma of the liver with metastasis to bone occurring in a patient known to have had advanced cirrhosis eight years previously. A number of features in this case are worthy of comment. The absence of abnormalities in a number of tests of liver function and of any of the clinical features generally encountered in cirrhosis at a time when the liver of this patient was frankly cirrhotic is of interest. The patient showed a pathologic urobilinogenuria, a slight hypoproteinemia and some retention of dye with the 5-mg. dose of bromsulfalein. On the other hand, the Takata–Ara and the galactose tolerance tests were negative and there was no dye retention with the 2-mg. dose of bromsulfalein. These findings serve to emphasize the now well-known fact that any given test of liver function may be negative despite the presence of a frankly cirrhotic liver. There are to these authors' knowledge no references in the literature to the length of survival of patients following the demonstration of a frank cirrhosis of the liver in the absence of clinical or laboratory evidences of hepatic decompensation. All the figures usually given for the duration of life in patients with portal cirrhosis are calculated from the time of onset of symptoms or findings to which the hepatic disease has given rise. It is important, however, for it is to be realized that the existence of a cirrhotic liver may well antedate by a considerable number of years the manifestations of clinical portal cirrhosis. The relation between malignant primary tumors, especially hepatoma, and cirrhosis of the liver is striking. According to the consensus of a number of observers, upward of 75 per cent of cases of hepatoma are associated with cirrhosis. Whether an antecedent cirrhosis plays a role in the subsequent development of the carcinoma, as is the belief of most observers, whether cirrhosis follows carcinoma, as Wegelin propounded, or whether the two conditions occur independently cannot, of course, be determined by a single case. This report, however, does emphasize the association of the two conditions, and in this one case, at least, conclusively shows that the cirrhosis preceded the hepatoma by at least several years. The presence of metastasis to bone in cases of hepatoma of the liver is generally considered extremely rare.

According to Ruiz, Zamanillo and Salar,[64] the frequency of primary cancer of the liver without cirrhosis as reported in the literature is 1:1000. Primary cancer of the liver without cirrhosis can be differentiated from either primary cancer of a cirrhotic liver or secondary hepatic cancer by the rapid enlargement of the liver, its firmness, a smooth, hard border on palpation, moderate ascites and the acute course of the disease, which varies between four and five months after the onset of the symptoms. I believe that such a differential diagnosis is not possible on the basis of symptoms or physical signs. Even with peritoneoscopic biopsy, such a diagnosis may be difficult.

Kennaway[65] has examined the incidence of primary carcinoma of the liver in the Negro in Africa, comparing it with the incidence of the same lesion in the Negro in the United States. He concludes that such data as are available suggest that the high incidence of primary cancer of the liver found among Negroes in Africa does not appear among Negroes in the United States and is therefore not of purely racial character. The prevalence of this form of cancer in Africa may be due to some as yet unidentified extrinsic factor. The statistical evidence concerning this question is confused by the inclusion of cancer of the gall bladder in the same category with cancer of the liver.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

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CASE 31211

PRESENTATION OF CASE

An eighteen-year-old boy was admitted to the hospital because of severe diarrhea and weight loss.

Five years before admission, at the age of thirteen, the patient began to have episodes of moderately severe epigastric and precordial pain not related to meals; these occurred about twice a week and were usually relieved by belching. There was increased perspiration, and occasional vomiting without nausea. At the age of fourteen he had an appendectomy following a period of unknown duration of severe pain in the right lower quadrant of the abdomen, without vomiting. On the day following the operation he had about twenty-five stools. In the course of a month the number of stools decreased gradually, yet averaged ten to twelve per day, usually with mucus and occasionally with blood. From that time on the diarrhea never disappeared. One and a half years before entry he was admitted to another hospital, where a diagnosis of "colitis with infection" was made. He was treated with a low-residue diet and was discharged moderately improved. He had progressively less pain, tenesmus and urgency during the year before admission. He continued to grow but had lost 11 pounds during recent months.

The boy's parents were divorced when he was three years old. The patient lived with his mother and grandmother. The mother was a shoe-factory worker and was described by the patient as nervous and pessimistic. The patient did not make close friendships. Until he was seven years old he had had "fits" or convulsions about twice a year. He had had pneumonia at seven years of age.

Physical examination revealed an asthenic, poorly nourished but fairly well developed young man. The skin was pale, with "pimples" over the back. The teeth were carious, and oral hygiene was poor. There was clubbing of the fingers and toes, and slight tremor of the hands, which were always cold and moist. The lungs were clear, and the heart was normal. The abdomen showed one small area of slight deep tenderness with minimal spasm in the left lower quadrant. Neurologic examination was negative.

*On leave of absence.

The temperature was 99.5°F., the pulse 90, and the respirations 20. The blood pressure was 105 systolic, 65 diastolic.

Examination of the blood showed a red-cell count of 4,200,000; in the smear there was hypochromia with some poikilocytosis and anisocytosis. The platelets were greatly increased. The white-cell count was 12,750, with 2 to 8 per cent monocytes and some toxic granules in the neutrophils. The urine was normal. The first stool examined was guaiac negative, but later the stools showed ++++ guaiac tests. Repeated cultures were negative for pathogens, and no amebas were found. The serum nonprotein nitrogen was 23 mg. per 100 cc., and the chloride 105 milliequiv. per liter. The prothrombin time was 30 seconds (normal, 18 to 20 seconds). A Hinton test was negative.

A barium enema showed the barium to pass rapidly through a tube-like sigmoid and colon into the proximal portion of the terminal ileum. The bowel was extremely irritable, spastic and stiff. The spleen appeared enlarged.

The patient had three to sixteen bowel movements a day for the first six weeks. He received many transfusions of whole blood and plasma. The daily caloric intake was irregular but remained largely between 2000 and 3000 calories. He received sedatives, bismuth subcarbonate and belladonna during the first two weeks, then was given 14 gm. of sulfasuccidine a day. Proctoscopy to the level of the sigmoid revealed an extremely irritable, scarred colon with fibrosis and granularity; in some areas there was marked hyperemia, with large and small ulcerations, most of which oozed blood profusely. A barium enema four weeks after admission suggested advancement of the disease. The ileum did not fill.

Six weeks after admission an ileostomy was performed under local and Pentothal anesthesia. The surgeon noted that the cecum was pale and thickened. The terminal ileum appeared normal. It was divided 10 cm. from the ileocecal valve, and the proximal end brought through the abdominal wall. He drained from 1200 to 4700 cc. daily from the ileostomy and developed severe vomiting.

On the third postoperative day he developed right carpopedal spasm. He had a negative Trousseau sign. The serum calcium was 9.8 mg. per 100 cc., and the phosphorus 4.4 mg.; the sodium was 128 milliequiv. per liter, and the chloride 84 milliequiv. Despite vigorous sodium chloride therapy, the serum chloride rose very slowly. A week after operation the small bowel became distended and abdominal cramps became quite severe. A Miller–Abbott tube brought some relief. It was soon found that there was an intermittent obstruction a few centimeters within the ileostomy and that about six catheterizations of the ileum daily afforded relief of the cramps.

The caloric and electrolyte needs could scarcely be met in view of the ileostomy loss, which was enhanced by the obstruction proximal to the stoma. His weight fell 21 pounds in four weeks; he became weaker and his skin lesions became worse. This situation, in addition to the development of bleeding from the ileostomy, presumably due to the repeated catheterization, brought about a decision to operate again to relieve the mechanical obstruction, if possible.

At the second operation, one month after the first, the small bowel was found uniformly dilated with no single obstructive point. There was a twist several centimeters proximal to the stoma but no clear-cut obstruction. The serosa, however, was cyanotic, with dilated, almost "varicose" veins in the mesentery. No obstruction to venous return could be found to explain this. On the serosa were several thin white plaques, where the wall of the bowel seemed extremely thin. No change in the ileostomy was made. His general course was little altered by operation.

Two days later the patient was suddenly seized with a severe midabdominal pain that became generalized; the abdomen was board-like, and he went into shock and died in the course of two hours.

Differential Diagnosis

Dr. Helen S. Pittman: This is a long case, and I do not believe that there should be much discussion about the diagnosis. There may be a few atypical features and a few complicating factors, but by and large this is a classic case of chronic idiopathic ulcerative colitis occurring in a young man with a characteristic unhappy social background, which is important. He had a family situation that was thoroughly bad. The patient was an unhappy spontaneous person who did not make close friendships and was the sort of person in whom ulcerative colitis may develop.

Then we go back in the past history and see that at thirteen, five years before entry, he began to have trouble with the gastrointestinal tract. One year after that, at the age of fourteen, he had an appendectomy. Almost surely he did not have acute appendicitis but, rather, ulcerative colitis. I think that it is usually the patient with regional enteritis, rather than colitis, who comes to the hospital after having had a previous appendectomy, and the patient with ulcerative colitis may come after hemorrhoidectomy, both of which are mistaken diagnoses. But I am quite sure that this operation four years before entry was performed because of symptoms due to ulcerative colitis and that it threw him right over into the frank clinical colitis, because on the day following operation he had twenty-five stools. He went along, probably without anyone really understanding what was going on, for quite a long time. It was not until two and a half years later that he went to a hospital for treatment, and it was at that time that the diagnosis "colitis with infection" was made. He apparently did well on a low-residue diet. He continued to grow, but it seems to me that a great many of these young people with ulcerative colitis have fairly big frames, so there is nothing too surprising about that. He had lost 11 pounds preceding entry, which in an eighteen-year-old boy is quite a lot.

He had pneumonia at the age of seven years, which I put down as a positive finding but not relevant, any more than the "fits," which may have been due to epilepsy or something entirely different.

On examination he was pale, had skin lesions, a dirty mouth and clubbing of the fingers and toes; the last is not an infrequent finding in long-standing ulcerative colitis. He had cold moist hands, a finding perfectly compatible with that disease. He came in with a rather rapid pulse, minimal fever, mild anemia and slight leukocytosis. They happened to catch one stool without blood, but the rest were consistently guaiac positive. Amebas were looked for, but amebic infestation can probably be discarded. On admission the blood chemical values were normal, with a high normal chloride level, which probably means that he had not been having violent diarrhea before he came in. The prothrombin time was prolonged, which is frequent in these patients, all of whom have inadequate nutrition, including a deficiency of vitamin K. A barium enema showed changes characteristic of long-standing extensive idiopathic ulcerative colitis. Do the films show anything additional?

Dr. Milford D. Schulz: This is certainly the typical appearance of ulcerative colitis — shortened rigid walls, which do not collapse well on evacuation, and a granular mucosa. There are only a few ulcers.

Dr. Pittman: Ulcers lower down were seen through the sigmoidoscope. How big is the spleen?

Dr. Schulz: The tip of the spleen reaches below the costal margin, but it is not extraordinarily large.

Dr. Pittman: This boy of eighteen, having been ill for four years, probably five, came in with the advanced irreparable changes of chronic ulcerative colitis; he was carried along medically in an attempt to see what could be done by replacement therapy. He had profuse diarrhea, treated symptomatically, and then was started on sulfasuccidine, which is the drug of choice in afebrile ulcerative colitis, — this boy was essentially afebrile, — and a fairly good caloric intake. Proctoscopic examination showed characteristic lesions — a scarred, fibrotic, granular, hyperemic colon, with many ulcers of various sizes, most of them oozing profusely. A second barium enema suggested that the process was advancing. An ileostomy was then performed. He apparently was in reasonably good shape at that time, and I gather that it was not done in the sense of emergency. Sometimes as such it is a life-saving measure. It was presumably done because it was thought that nothing could be accomplished medi-

cally and that the only thing to do was to put the bowel at rest. At operation the surgeon noted that the cecum was pale and thickened. In other words the patient had changes as far up as the cecum. Whether there was a secondary factor, such as tuberculosis, I do not know. I am inclined to think that there was none and that the process was merely extensive, involving the whole colon.

Following ileostomy the patient got into trouble right away. Carpopedal spasm was present on the third day, with low phosphorus and chloride levels and so forth. I assume that these findings were probably due to the tetany that one finds with vomiting and loss of chloride, although certainly it is not uncommon to see tetany, with a change in the phosphorus and calcium levels, in long-standing intestinal disease of this sort.

Then began the postoperative battle to keep up the intake, and in this case the battle was lost. They began catheterization of the ileostomy, which is a questionable procedure. I believe that Dr. Moore and Dr. McKittrick think that, in general, dilatation of the stoma is safer than catheterization. The patient began to bleed, and it may well have been from the trauma of the catheterization, but we have no data concerning the prothrombin level at that time. The chances are that it was greatly prolonged. He had been losing large amounts of fluid and had not been able to maintain the chloride level. A second operation became imperative, and they found a uniform dilatation of the small bowel without definite obstruction. The serosa was cyanotic, and dilated veins were seen in the mesentery. I do not know what that was, unless edema of the tissues interfered with venous return. The serosal plaques again make one wonder whether to bring in tuberculosis, but I do not believe that it is necessary. They were thin plaques, with little left of the bowel wall, and probably one of these plaques was responsible for the terminal event two days later.

My diagnosis is chronic idiopathic ulcerative colitis, with a chronic deficiency state on entry because of several years of diarrhea. The dramatic episode was acute perforation of the small bowel, likely through one of the thin areas noted at the second operation.

DR. BENJAMIN CASTLEMAN: What do you think the pale areas in the small bowel wall were?

DR. PITTMAN: I think that they were areas of ulceration where the serosa was extremely thin, because they were described as being transparent. I do not believe that they were tubercles.

DR. WYMAN RICHARDSON: I saw this boy once and also saw his blood smear. I might mention that he had a normal or nearly normal red-cell count but a marked hypochromic picture due to blood loss. The hemoglobin must have been low. The polymorphonuclear cells contained toxic granulations, a picture frequently seen in severe ulcerative colitis, which suggests that the disease is of infectious origin.

DR. ERICH LINDEMANN: We had this boy for four weeks on the Psychiatric Service. In some patients with ulcerative colitis a reduction in emotional tension has been followed by such an improvement in the colitis that psychiatric work has become an important factor in treatment. This, however, usually happens in patients with relatively well-adjusted personalities from the psychologic point of view who have recently undergone a severe emotional disturbance following a crisis, such as bereavement. This patient showed a long-standing personality disorder, the correction of which would have required a considerable period of intensive psychiatric work. The disease was too advanced for this work to be attempted.

On the other hand, we expected a rather severe emotional reaction to the operation, because the patient was haunted by morbid fears in connection with fantasies about violence and destruction. He anticipated the operation with extreme anxiety. Considerable efforts to reassure him and to prepare him for the operation seemed to have but little effect.

DR. FRANCIS D. MOORE: The consensus of those who took care of this boy was that an immediate ileostomy when he first came in might have resulted in a more satisfactory outcome. It is asking a lot of the Psychiatric Service to take the responsibility for holding up operation; such a decision rests with the Surgical Service, which evidently underestimated the extent of the patient's disease.

I should like to comment on one or two things that were said in the discussion. At the present time, following ileostomy we frequently see patients who do not have an inordinate fluid loss from the stoma. In fact any patient who has severe loss of fluid and electrolytes may have either ulceration in the terminal ileum or partial obstruction; possibly this boy had both. So far as catheterization is concerned, Dr. Pittman is absolutely correct. The fewer foreign bodies put in and out of an ileostomy, the better. This boy's obstructive point seemed to be 10 cm. inside the stoma. He was not in shape to operate on again, and catheterization seemed to be the only way out. So far as the last operation is concerned, the areas of discoloration on the bowel were 1 to 2 cm. in diameter, so that the chance of their being real tubercles was relatively small. It was a "sick-looking" bowel, and I had no idea what underlay the changes in the bowel wall or the peculiar dilated veins in the mesentery. I had never seen the latter before and could find no ready explanation for it.

CLINICAL DIAGNOSES

Chronic ulcerative colitis.
Perforation of ileum.

DR. PITTMAN'S DIAGNOSES

Chronic idiopathic ulcerative colitis.
Dietary deficiency, chronic.
Perforation of ileum.

ANATOMICAL DIAGNOSES

Chronic ulcerative colitis.
Acute ulcerative ileitis, with perforation.

that were seen at operation. The entire colon was extremely thick, and the lumen was narrowed — a true "garden hose" variety (Fig. 1). The process in the colon was practically healed, and we were unable to find any extensive acute ulcers. The ileum, on the other hand, was markedly hemorrhagic and very thin, and when opened, there were numerous ulcers measuring 1 to 2 cm. in diameter,

FIGURE 1. *Photographs of Sections of the Small and Large Bowel.*
A — *acute ulcerations of ileum*; B — *perforated ulcerations of ileum*; C — *chronic fibrotic lesions of colon.*

Acute generalized peritonitis.
Operations: ileostomy; laparotomy.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: The autopsy showed an extensive infection of the peritoneal cavity and perforation of several of the thin areas in the terminal ileum three of which had perforated. These ulcerations occurred only in the proximal loop of the ileostomy. The distal loop of ileum was perfectly normal, showing no evidence of edema, hemorrhage or anything that suggested ileitis. This suggests that the disease that we found in the terminal ileum was not present at the time of the ileostomy but had occurred follow-

ing ileostomy; as Dr. Moore has suggested, this disease in the ileum may have been due to a partial obstruction. Dr. McKittrick, after hearing the results of this case, said that he recalled one other case in which a similar ileitis had occurred following obstruction in the ileum; he wondered whether this ileitis might have resulted from obstruction. You did not find obstruction in the ileum at the time of operation, Dr. Moore? Perhaps there was some other factor, but the fact that the distal loop was not involved suggests that it may have been the mechanical factor of obstruction that contributed some way in the development of this severe acute ulcerative ileitis and death.

DR. MOORE: We did not find obstruction, and yet, as has been pointed out in these meetings before, obstruction of an ileostomy can be due to the interaction of two factors — the caliber of the ileostomy and the propulsive force of the bowel behind it. With even a normal ileostomy stoma, a proximal bowel with deficiency disease cannot push the fecal stream through.

DR. RICHARDSON: What happens is that a lot of digestive juice does not reach the distal ileum. One of the surprising things about human beings is that they do not "eat up their own guts," so to speak. I think that it may be a factor in cases of ulcerative colitis.

DR. PITTMAN: What about catheterization? Was there really a stenosis of the stoma, and could there have been enough trauma to cause the perforation?

DR. MOORE: The patient died in two hours, obviously from a perforation of a hollow viscus. We were afraid of catheter trauma, but these lesions were about 150 cm. above the stoma.

CASE 31212

PRESENTATION OF CASE

First admission. A twenty-one-year-old machinist was admitted to the hospital with fever, precordial discomfort and inflamed joints.

At the age of eight he had chills and fever and developed warm and red joints and masses on the back of his hands. He was not asymptomatic until the following summer, about eight months later. During the next winter the same illness recurred with fever and warm, swollen, red joints. The joints of the hands were exquisitely tender. He spent that winter in a hospital, where splints were used to correct flexion deformities of the fingers. The following spring his joints suddenly and spontaneously improved, and he walked for the first time in six months. He was said to have no involvement of the heart. Four years later, he had another severe recurrence. He spent almost a year in bed, and he was soon free of symptoms and deformities. He subsequently attended a trade school for a year, and three years before admission he began to work as a machinist. Until the present illness he had been well and had worked sixty hours each week in a shop. Four weeks before entry he awoke with a sense of precordial and substernal pressure aggravated by deep breathing. A headache was somewhat relieved by elevating the head on four or five pillows. He also began to note considerable malaise. Five days later the temperature was 99.8°F., and it had remained elevated until admission. An electrocardiogram at that time was said to have indicated that he had a "wicked heart." About three weeks before entry the elbows, shoulders and knees became stiff and tender. At about that time the throat became sore. A week later a physician noted pink spots on the toes. Two or three days before admission he had periumbilical abdominal cramps. On the day before admission he had several more such attacks, accompanied by vomiting and diarrhea. He had lost an unknown amount of weight.

He had drunk three or four bottles of beer and three or four "shots" of whisky every day. He had never had scarlet fever.

Physical examination showed a man with hot moist skin, appearing extremely ill. The heart was 10 cm. to the left of the midsternum in the sixth interspace. There was a regular rate of 110. A mitral diastolic rumble with a presystolic accentuation was thought to be heard. The lungs were clear. The liver was not considered to be significantly enlarged but there was definite tenderness in the region of the liver. The tip of the spleen was palpable on inspiration. The fingers, wrists, elbows and shoulders were painful, tender and stiff. There were several reddish-brown spots, suggestive of petechiae, on the dorsum of the left great toe.

The temperature rapidly rose from 101 to 104.4°F., and the pulse from 90 to 120. The respirations were 20. The blood pressure was 130 systolic, 65 diastolic.

The urine was light amber, cloudy and acid in reaction, with a specific gravity of 1.004 and a +++ test for albumin; the sediment contained 3 white cells per high-power field. There was no sugar, diacetic acid or bile.

Examination of the blood showed a white-cell count of 18,600, with 87 per cent neutrophils and 8 per cent lymphocytes. The hemoglobin was 9.8 gm. per 100 cc. A blood Hinton test was negative. A stool was green and formed; it was guaiac negative. The sedimentation rate was over 2 mm. per minute. The serum nonprotein nitrogen was 34 mg. per 100 cc., the protein 6.1 gm., and the cholesterol 195.0 mg. The chloride was 91 milliequiv. per liter. A van den Bergh test was negative. The prothrombin time was 54 seconds (normal, 18 to 20 seconds). A cephalin flocculation test was + in forty-eight hours. Agglutination tests for typhoid, paratyphoid and undulant fevers were negative. One

flask of a blood culture grew *Staphylococcus albus*. A number of repeat cultures were negative.

An electrocardiogram on the third day showed a PR interval of 0.15 second, upright but low T_1 and T_3 and a diphasic T_2.

The temperature spiked to 103°F. during the first four hospital days. It was then nearly normal for four days, only to be followed by four more days of spiking between 98 and 105°F. It returned to normal again twenty-four hours after the onset of intramuscular penicillin therapy. He had several episodes of diarrhea and vomiting during the first week. These did not recur after aspirin was withheld.

During the second week the spleen appeared larger, and definite lymphadenopathy was noted. The protein had fallen to 4.4 gm. per 100 cc., with an albumin-globulin ratio of 1.2. On the fifteenth day the patient developed slight jaundice. The van den Bergh reaction was 3.4 mg. per 100 cc. direct and 4.6 mg. indirect. The jaundice, fever, joint pains and splenomegaly definitely improved after the fifteenth day. The prothrombin time, the leukocytosis, the sedimentation rate and the van den Bergh reaction also improved gradually during the third and fourth weeks in the hospital. The anemia persisted and the serum protein did not rise above 4.5 gm. The patient had some edema.

After a month in the hospital the patient was discharged to his home, apparently well except for slight pain in the left shoulder.

Second admission (three weeks later). During these three weeks he had had a constant cold and sore throat. One week after discharge the shoulders, elbows, hips and knees again became stiff and painful. A week later he developed chest pain, which was severest substernally but shifted from side to side and occasionally extended through to the back. This pain was partially relieved by belching. During the week before admission he vomited almost daily and had severe orthopnea and slight fever. He had had no cough or ankle edema.

Physical examination revealed the patient to be pale and emaciated. The heart and lungs appeared unchanged. The left elbow was swollen and fluctuant. The right elbow and both knees were swollen. There was slight tenderness in the left lumbar region.

The temperature was 100°F., the pulse 120, and the respirations 24. The blood pressure was 100 systolic, 70 diastolic.

During the five weeks spent in the hospital the urine and blood picture remained constant. The urine had specific gravity that was never above 1.008 and gave a ++ test for albumin; the sediment contained an occasional hyaline cast and red cell and 5 white cells per high-power field.

The white-cell count varied from 15,000 to 22,000, with about 80 per cent neutrophils. The hemoglobin remained between 7 and 10 gm. per 100 cc. The smear appeared normal. The sedimentation rate averaged over 3 mm. per minute but returned to normal in four weeks. The serum nonprotein nitrogen was 36 mg. per 100 cc., and the protein 5.8 gm., with an albumin-globulin ratio of 0.78. The prothrombin time was 27 seconds (normal, 18 to 20 seconds), and the cholesterol 258 mg. per 100 cc. Urine and blood cultures were negative.

The temperature spiked to 102.5°F. for three days after admission, after which it rarely rose above 99.

X-ray examination of the bones of the shoulders showed decalcification, the auricular surfaces of the humeri were somewhat irregular, and there seemed to be subcortical absorption of bone.

Although the joint pains and leukocytosis persisted he was discharged to his home for further bed rest and physical therapy.

Final admission (four days later). On the day after discharge he had transient episodes of irrationality and, on the following day, became dyspneic while lying in bed. His physician gave him codeine for joint pain and left pleuritic pain. On the fourth day at 9 a.m. he could not be roused and was readmitted.

Physical examination revealed a pale, thin, dehydrated man. He could be aroused only by painful stimuli. The eyeballs were soft. The neck was not stiff, and a bilateral Hoffmann's sign was elicited. The heart was regular, with a rate of 100.

The temperature was subnormal, and the respirations 16. The blood pressure was 110 systolic, 45 diastolic.

The lungs soon became filled with moist rales and the blood pressure fell to 80 systolic, 20 diastolic. The urine gave a ++++ test for albumin and had a pH of 5.5 and a specific gravity of 1.012. The white-cell count was 30,000, with 90 per cent neutrophils. The serum nonprotein nitrogen was 180 mg. per 100 cc.

The patient became progressively more dyspneic and cyanotic. There were fibrillary twitchings over the body, and he expired about twelve hours after admission.

Differential Diagnosis

Dr. William W. Beckman: On first glance at this record, one thinks of a bacterial infection of some sort. The patient had fever, malaise, weight loss, a markedly elevated white-cell count and an elevated sedimentation rate. These are the clinical features of bacterial infection. If it were an infection it was of several months' duration. This fact alone, with the cardiac findings and the past history of joint disease, makes one wonder about subacute bacterial endocarditis. In spite of all this evidence I have come to the conclusion that this was not a bacterial infection. In the first place, he was a young man who had had several previous attacks of joint disease and whose present illness was again characterized by joint symptoms in addition to the constitutional manifestations.

Therefore, one would like to relate the present illness to the previous ones and to consider it as being an exacerbation of some fundamental process. If the previous attacks of joint disease had been more clearly like rheumatic fever one could relate them, by saying that he had rheumatic heart disease and a superimposed subacute bacterial endocarditis. But actually the description, at least that of the second and the third attack, is not that of rheumatic fever, because he had definite joint deformities of long duration that required orthopedic correction. My conception of rheumatic fever visualizes acute joints, without marked deformity, which rarely if ever become chronic, whereas I believe that the description of the earlier illnesses is exactly what would be expected in rheumatoid arthritis. Another point against any kind of infection is the negative bacteriology throughout the course of the illness. No one knows from the record how many blood cultures were taken but certainly there must have been a great number during the first and second admissions. On one occasion *Staph. albus* grew in one flask, but that can safely be put down as a contaminant. The so-called "response" to penicillin does not appear to have been a true response, and this is further evidence that there was not a bacterial organism susceptible to penicillin. When the fever came down, it looked like a wonderful response, but the same thing had occurred spontaneously eight days before, without penicillin. In spite of the fact that the fever came down, it is obvious that the fundamental process did not improve in any way. He continued to have leukocytosis, an elevated sedimentation rate and joint pains, as well as all the other symptoms of his illness. Therefore I do not believe that it can be called a response.

I should like to know what it means when it says that the tests improved. Does it mean that they were normal or merely went in the direction of normal after penicillin?

DR. BENJAMIN CASTLEMAN: Dr. Berg, can you tell us about that?

DR. ROBERT L. BERG: The van den Bergh test was too low to read, and most of the other tests became more nearly normal. The sedimentation rate, however, remained elevated.

DR. MARIAN W. ROPES: So did the white-cell count.

DR. BECKMAN: The fact that the tests did not return to normal, although they went in the direction of normal, provides further evidence that penicillin did not fundamentally affect the course of the illness. This militates against the diagnosis of subacute bacterial endocarditis.

He had spots on his toes that resembled petechiae, but in subacute bacterial endocarditis of three months' duration I should expect a great deal more evidence of embolic phenomena. Focal emboli to the kidney might explain the albuminuria, but if that were the case a fluctuating urinary picture with showers of red cells would have been found, rather than a constant one without red cells. It expressly states in the record that the urinary findings were constant. An enlarged spleen can go with bacterial endocarditis, but splenomegaly is by no means diagnostic of this or any disease.

On the basis of these considerations I decided that this man did not have a significant bacterial infection. If any was found at autopsy it probably represents a terminal event that had no particular relation to the course of the total illness.

My ideas about the fundamental process in this case are rather difficult to express. Although I shall not be able to make a single diagnosis that will explain all the signs and symptoms, I believe that he was suffering from a single disease process and that that process can be classified as a member of the group of related syndromes that includes rheumatic fever, rheumatoid arthritis, disseminated lupus erythematosus, dermatomyositis, periarteritis nodosa and so forth. These diseases or syndromes are similar in that they all have marked constitutional symptoms, such as excessive fatigability, weight loss and cold sweating hands and feet. The courses of all of them may be punctuated by fever, although this is less frequent in rheumatoid arthritis. Joint signs and symptoms of varying degree are common to all. Except in lupus erythematosus disseminatus, leukocytosis may be present.

In addition to all these things that are common to the entire group, each member has features not present in the related conditions that dignify it as a syndrome. Rheumatoid arthritis, for example, is characterized by deformed joints, with both x-ray and pathological evidence of bone and joint destruction, whereas rheumatic fever shows characteristic heart involvement. That is to say, there is something in the straight clear-cut syndrome of rheumatoid arthritis that is not present in the syndrome of rheumatic fever, lupus erythematosus or any of the others. The same can be said for each of these related syndromes. Many names have been suggested for this large aggregate of related diseases. Such terms as generalized constitutional disease, generalized connective-tissue disease, mesenchymal disease, generalized vascular disease and neurovascular disease have been employed by various authors. Any one of them, however, is much too limited in scope to describe adequately the widespread nature of this group of diseases. For want of a better name we in the Arthritis Clinic of this hospital have adopted the convention of calling them "The Group." We continue to search for an adequate name and welcome suggestions.

Another reason we believe that these conditions are related is that not infrequently one encounters in a single patient at a given time the characteristic features of two or more of these syndromes. This is well exemplified by this case. In the first place, I think there can be no doubt that he had the neces-

sary criteria for the diagnosis of rheumatoid arthritis. The description of the second and third attacks is quite clearly that of Still's disease. I do not believe that anyone would have had difficulty in making the diagnosis. The child was extremely sick, with fever and weight loss. Joint deformities developed that required straightening by means of splints. This is an almost unheard of train of events in rheumatic fever. Furthermore, the present joint manifestations sound classic for rheumatoid arthritis, and the x-ray films, as they are described, are also classic for rheumatoid arthritis. The films of the shoulders are all that we need to see.

DR. MILFORD D. SCHULZ: This film of the left shoulder shows subchondral decalcification and irregularity of the subchondral bone.

DR. BECKMAN: The x-ray film is characteristic of rheumatoid arthritis and, coupled with the clinical course of this attack and the previous ones, makes that diagnosis mandatory. The fever, leukocytosis, anemia, splenomegaly, lymphadenopathy and elevated sedimentation rate are all often seen in rheumatoid arthritis.

Rheumatic heart disease has frequently been found in post-mortem examinations of patients with unquestionable rheumatoid arthritis.[1,2] This always raises the unanswerable question, Were the patients suffering from both rheumatoid arthritis and rheumatic fever or from a single process that produced both joint and heart lesions? I am confused about whether the characteristic cardiac findings of rheumatic fever were present in this case, and I shall have to have Dr. Castleman tell me. The typical murmur of mitral stenosis was "thought to be heard" on admission, but in all the subsequent physical examinations the heart was described as "the same." Was there evidence of heart disease?

DR. CASTLEMAN: Dr. Lerman, can you answer that?

DR. JACOB LERMAN: I should say that he did not have evidence of rheumatic heart disease.

DR. BECKMAN: I wondered, because it is difficult to interpret "thought to be."

We apparently do not have to consider rheumatic fever. The marked renal disease, however, cannot be explained by rheumatoid arthritis and suggests another member of "The Group," — lupus erythematosus, — which is characterized by splenomegaly, lymphadenopathy, serous-membrane involvement, fever and renal disease as extensive as this, leading to a nephrotic-like picture and to death. One can categorically say, however, that this patient did not have lupus erythematosus because he did not have the characteristic skin lesions and leukopenia, both of which are essential features of the illness. But the kidney picture does suggest it. Periarteritis nodosa, another member of "The Group" also produces renal disease. It is a generalized vascular disease and as a clinical entity it is characterized by evidence of vascular disturbances, such as angina pectoris, cerebral accidents, mesenteric thrombosis and so forth. It may occur, however, in association with other members of "The Group." This was eloquently pointed out in 1938 by Dr. Soma Weiss[3] in the discussion of a case of clear-cut disseminated lupus erythematosus. It appears to be, as indeed do all the members of "The Group," a response of the body to a variety of stimuli.

The lesions of periarteritis nodosa have been observed in patients suffering from serum sickness and also in patients suffering from sulfonamide intoxication. They have been produced experimentally in animals by the injection of certain fractions of human serum protein. The frequent association of this type of vascular change with the other members of "The Group" makes it likely that the renal disease was on the basis of periarteritis nodosa. Of course I have no way of ruling out an independent lipoid nephrosis or chronic glomerulonephritis, but as I have said, I should prefer to explain all the features of this illness on a single disease process. We also have to consider the possibility of amyloid disease in association with rheumatoid arthritis. This occurs not infrequently. Amyloid disease, however, is usually observed in cases of long duration, and even though I believe that the same process had been present since the first attack, at the age of eight, it is unlikely that amyloid disease developed in this case, because of the eight years of complete freedom of symptoms that he had had before the onset of the present attack.

A word about the liver disease — that also, we think, can be associated with rheumatoid arthritis. We have been studying liver function in patients with rheumatoid arthritis and have been surprised at how many have had one or two disturbed liver-function tests. We have had several autopsies in this hospital on cases of "The Group" in which definite pathological evidence of liver disease was found.

The terminal episode was uremia, although one cannot rule out a vascular accident. It might have been the latter, for it was rather abrupt. This is further evidence of periarteritis nodosa. I shall sum up by saying that the disease lies in the group of syndromes that I have discussed, the likeliest one being rheumatoid arthritis, with features of several of the other members, and that the renal lesions were due to periarteritis nodosa.

DR. LERMAN: I have mentioned the fact that this patient did not have rheumatic heart disease. When he first came in we thought that the underlying disease was subacute bacterial endocarditis, in spite of the fact that the normal state of his heart was against it. We watched him for ten days, and the temperature continued to spike up to 105°F. In fact we were sure that he was going to die. As a last resort we tried penicillin, and the response was dramatic. The temperature fell to normal on the

second day. Not only was there an improvement in temperature, but his clinical condition also improved. Everyone who saw him agreed that he had made a good response to penicillin. A course of penicillin at the time of his second admission also caused improvement, but the response was not too definite. After a period of time he was able to go home.

DR. J. H. MEANS: I saw this man half an hour before he died and refrained from making a diagnosis, although I did make a correct prognosis. I did not believe that he had subacute bacterial endocarditis, although I thought that it was a possibility. I thought that he had more than uremia to account for his death, and I wondered whether he had had a cerebral vascular accident as a terminal episode.

DR. ROPES: In regard to the response to penicillin, it is true that he improved clinically, but to me at least, it was not a real response because the laboratory signs of activity persisted and the leukocytosis continued to be 18,000 to 20,000 after one of the courses of treatment. In addition, we often see a similar course in this group of diseases without the use of penicillin. In lupus erythematosus and less frequently in rheumatoid arthritis, we frequently observe this picture — a high fever that appears suddenly, lasts a few days and then disappears. During that period the patients often appear moribund and yet recover. In such cases the question often arises whether or not they should receive sulfonamides. In some of them we have thought that the giving of sulfonamides led to death. We did not have that problem in this patient, however, since there is no evidence that penicillin causes similar bad results in patients with these diseases.

CLINICAL DIAGNOSES

Lupus erythematosus disseminatus?
Subacute bacterial endocarditis?
Uremia.

DR. BECKMAN'S DIAGNOSES

Rheumatoid arthritis.
Periarteritis nodosa, involving the kidney.

ANATOMICAL DIAGNOSES

Rheumatoid arthritis.
Amyloidosis of kidneys, spleen and liver.
(Uremia.)
Polyserositis, hemorrhagic.
Bronchopneumonia.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: The autopsy showed about 250 cc. of clotted blood in each pleural cavity. We found the same amount of blood in the abdominal cavity but no signs of peritonitis. The heart was normal in size, but on the epicardial surface was a loose, adherent gelatinous material producing interadherence between the parietal and the visceral pericardium. Sections of the pericardium showed microscopically numerous polymorphonuclear cells and fibrin, suggesting an acute or subacute pericarditis. The same reaction was present on the pleura and peritoneum. There was therefore a hemorrhagic polyserositis. The valves of the heart were normal. There was no evidence of rheumatic heart disease, and no thrombi on any of the valves to suggest a nonbacterial thrombotic endocarditis, such as one sometimes sees with lupus erythematosus.

The kidneys were the striking feature of this autopsy. They weighed 600 gm. together, and were quite hard and white. In the gross the condition almost suggested lymphomatous infiltration. Microscopically this whitish infiltration proved to be an extensive amyloid degeneration. Practically every glomerulus and vessel were involved. No wire-loop lesions, which are often seen in cases of lupus erythematosus, were observed. The amyloidosis was corroborated by the findings in the spleen, which weighed 450 gm. and had what is often called a "sago" appearance. Microscopically all the vessels in the centers of the Malpighian corpuscles showed marked amyloid degeneration of their walls.

DR. ROPES: We were unable to examine the joints but did get fluid from the shoulder joint, which contained approximately 70,000 white cells of which 85 per cent were polymorphonuclear cells, and there was also a great deal of what must be called cellular debris, similar to the material we see in cases of rheumatoid arthritis of long duration, where there is a great deal of tissue destruction.

DR. CASTLEMAN: We inoculated the material into various aerobic and anaerobic mediums but were unable to obtain any growth. The blood culture was also negative. I believe that there is little doubt that the joint disease was rheumatoid arthritis.

DR. ROPES: The fluid sugar was high, which one does not find usually with infectious arthritis even following intravenous glucose administration.

DR. CASTLEMAN: I do not believe that the joint lesions were infectious. The patient did have a terminal bronchopneumonia. I still do not understand why there was frank blood in the pleura and peritoneum.

DR. LERMAN: Could it have been associated with the uremia?

DR. BECKMAN: Pleural and pericardial involvement is not infrequent in rheumatoid arthritis.

DR. ALLAN M. BUTLER: How common is amyloid disease in rheumatoid arthritis?

DR. ROPES: It varies; in some small series of Still's disease it has been reported as high as 50 per cent. It has not usually been reported so high as that in this country, and in our group it is relatively low — below 10 per cent. We have had several patients with amyloid disease but the usual

course is a slow downhill one with gradually increasing renal failure.

It is interesting that Carroll and Nelson[4] have reported a case of rheumatoid arthritis with amyloidosis in which the patient died with hemorrhage in the abdomen.

DR. LERMAN: It is a general principle that new therapeutic agents bring about new clinical pictures as complications or sequelae. For example, thiouracil causes agranulocytosis, characteristic febrile reactions and adenopathy. The sulfonamides cause a characteristic nephritis. I should like to offer the suggestion that this type of case represents the sequence of events that may follow the use of penicillin and that such cases may occur regularly in the future. Let us assume that this patient had a history of rheumatic disease fifteen years previously. This may have been rheumatic fever or rheumatoid arthritis. He develops a fulminating infection that behaves in some respects like subacute bacterial endocarditis or septicemia. Penicillin produces a dramatic recovery. The bacteria, however, are not licked — they go underground. The serous cavities are a good hideout, and the infection smolders along there without any serious systemic reaction. Death finally results, not from the infection but from a degenerative process caused by chronic suppuration. An analogous sequence of events takes place in chronic osteomyelitis.

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VICTORY IN EUROPE

It seems particularly fitting that our day of victory in Europe should have come in May, for May is the month that we long ago selected in which to have our day of remembrance, and there is much that we must not forget.

We must not forget our grim horror at the tales of Buchenwald, Nordhausen, Belsen and Erla, at prisoners of war murdered in the snow, at unrestricted U-boat sinkings, at Coventry and at the blind rage of rocket bombs. We must remember these things, not with hate, but with a long memory that can outlive the passing of events. We must remember the forgetfulness of the years after 1918, with a determination that we will not so easily forget again.

We must remember the soil that will be forever reddened with the blood of young Americans — at Kasserine Pass and over the hills that fall away to Tunis and Bizerte, in Sicily and at Salerno, at Benevento and Cassino, in the cockpit of Anzio and up the bony ridge of Italy, on the beaches and across the fields of France, and on the plains and by the rivers of Germany.

We must bear in mind certain words that have become part of our spiritual bill of rights — "That from these honored dead we take increased devotion to that cause for which they here gave the last full measure of devotion; that we here highly resolve that these dead shall not have died in vain; that the nation shall, under God, have a new birth of freedom. . . ."

We must remember a new lesson, phrased by Norman Corwin in words written apropos of this event that we now commemorate — "We've learned that freedom isn't something to be won and then forgotten. It must be renewed, like soil after yielding good crops; must be rewound, like a faithful clock; exercised, like a healthy muscle."

And still we must remember that another victory is yet to be won, our power redeployed, another mile traversed, however long, before we can devote ourselves fully to the problems of a peace so hardly won.

THE CASE AGAINST FRIED FOODS

As long ago as February, 1944, Dr. Frank Howard Richardson[1] published in the *Journal of Pediatrics* the results of his ardent researches into the digestibility of fried foods. Up to that time it had been assumed, and in those quarters unacquainted with his conclusions it still is assumed, that fried foods are harmful, especially for children. With wartime shortages particularly in mind, Dr. Richardson thought that the soundness of our dietary beliefs should be investigated.

Three sources of authority were open — published records of research, current books and bulletins, and the opinions of living experts in the fields of

nutrition and pediatrics. Surprisingly, only one piece of published research was revealed, and that nearly seventeen years older than the present study: in 1927, Boggess and Ivy[2] had investigated, on dogs and human beings, the digestibility of potatoes prepared after various culinary patterns. According to their conclusions, the starch of the pan-fried potato is more easily digested than that of the French-fried, and that of the French-fried more easily than that of the boiled specimen. Fat, it was found, actually facilitated the rate of digestion, determined by fluoroscopic observations.

Dr. Richardson found that authoritative textbooks on nutrition, federal and state health bulletins, pamphlets on child care and so forth almost universally condemned all foods prepared after the fashion that made famous, if not popular, the sixth day of the week. No scientific proof was presented for these pontifical opinions: fat may be an excellent food principle, but not the foods that are cooked in it. So far as these tribunals are concerned, the only edible part of the doughnut is the hole. "In frying," according to one of these witnesses, "decomposition products are formed, which are irritating to the digestive tract." And that was that.

Various specialists were then consulted — eleven nutritionists, biochemists and physiologists, seven pediatricians of national reputation, two pediatricians high in the Children's Bureau, two gastroenterologists, one nutrition director of the American Red Cross, two medical editors and two research-bureau heads. Not one of these authorities let the investigator down. The cruelest indictment of fried foods was that overindulgence might be unwise; a differentiation was also made of fried foods properly cooked and those that were simply soaked in hot fat.

And so at last comes vindication, permanent we trust, for the fried spud, the flapjack and the doughnut, the crisp egg — sunny side up or, in the vernacular, "one eye open" — and the Sunday-morning fishball.

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MASSACHUSETTS MEDICAL SOCIETY

DEATHS

BATTERSHALL — Jesse W. Battershall, M.D., of Attleboro, died May 4. He was in his fifty-second year.

Dr. Battershall received his degree from Tufts College Medical School in 1916. He had served as medical examiner in Bristol North district for twenty years and as school physician in Attleboro for twenty-three years. In 1943 he was named municipal health officer. He was a member of the Sturdy Memorial Hospital staff.

His widow survives.

LEIB — Edwin R. Leib, M.D., of Worcester, died May 3. He was in his seventy-first year.

Dr. Leib received his degree from Boston University School of Medicine in 1899. He retired as chief of the medical service at Hahnemann Hospital a few months ago but remained on the staff as a consultant. He was also a consultant on the Belmont Hospital staff. For more than thirty years, Dr. Leib had served as epidemiologist in the Worcester Health Department. He was president of the Worcester Blood Bank.

His memberships included the Worcester District Medical Society of which he was past president, as well as a councilor at the time of his death. He was a fellow of the American Medical Association.

His widow and a brother survive.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

COMMUNICABLE DISEASES IN MASSACHUSETTS FOR APRIL, 1945

Résumé

Diseases	April 1945	April 1944	Seven-Year Median
Anterior poliomyelitis	2	1	1
Chancroid	2	1	*
Chicken pox	964	2791	1286
Diphtheria	24	18	13
Dog bite	1317	908	945
Dysentery, bacillary	0	0	7
German measles	195	398	398
Gonorrhea	463	319	355
Granuloma inguinale	0	0	*
Lymphogranuloma venereum	2	7	*
Malaria	124	55	2
Measles	732	3491	4012
Meningitis, meningococcal	21	40	7
Meningitis, Pfeiffer-bacillus	2	5	1
Meningitis, pneumococcal	7	9	4†
Meningitis, staphylococcal	0	1	0†
Meningitis, streptococcal	0	2	1†
Meningitis, other forms	2	0	2†
Meningitis, undetermined	2	13	8†
Mumps	2431	1483	1109
Pneumonia, lobar	322	350	390
Salmonella infections	6	5	5
Scarlet fever	1428	1724	1641
Syphilis	342	334	455
Tuberculosis, pulmonary	219	179	232
Tuberculosis, other forms	7	18	19
Typhoid fever	2	4	3
Undulant fever	2	3	3
Whooping cough	568	313	625

*Made reportable in December, 1943.
†Four-year average.

Comment

Diphtheria is still at a high point — the highest April for the last ten years. This year's April figure of 24, however, is far below those of Aprils previous to 1935.

Meningococcal meningitis remained well above the seven-year median. It should be remembered, however, that the figures on which this seven-year median was based include several Aprils with extremely low incidences.

Mumps was very prevalent but is beginning to show the usual seasonal decline.

Measles continues at an extremely low point.

All the cases of malaria originated outside the United States.

GEOGRAPHICAL DISTRIBUTION OF CERTAIN DISEASES

Anterior poliomyelitis was reported from: Boston, 2; total, 2.

Diphtheria was reported from: Boston, 8; Brockton, 1; Camp Edwards, 2; Everett, 1; Falmouth, 1; Hingham, 1; Lawrence, 1; Lowell, 3; Lynn, 1; New Bedford, 2; Revere, 1; Somerville, 1; Worcester, 1; total, 24.

Encephalitis, infectious, was reported from: Lexington, 1; total, 1.

Malaria was reported from: Boston, 2; Camp Edwards, 75; Cushing General Hospital, 9; Everett, 1; Natick, 1; Northampton (U. S. Veterans Hospital), 1; Quincy, 1; Regional Hospital (Waltham), 33; Springfield, 1; total, 124.

Meningitis, meningococcal, was reported from: Boston, 6; Easthampton, 1; Everett, 1; Haverhill, 1; Hingham, 1; Middleboro, 1; Quincy, 1; South Hadley, 1; Springfield, 4; Stoughton, 1; Sturbridge, 1; Walpole, 1; West Springfield, 1; total, 21.

Meningitis, Pfeiffer-bacillus, was reported from: Boston, 1; Lawrence, 1; total, 2.

Meningitis, pneumococcal, was reported from: Boston, 3; Cambridge, 1; Fall River, 1; New Bedford, 1; Reading, 1; total, 7.

Meningitis, other forms, was reported from: Boston, 1; Weymouth, 1; total, 2.

Meningitis, undetermined, was reported from: Boston, 1; Springfield, 1; total, 2.

Salmonella infections were reported from: Boston, 2; Lawrence, 3; Newton, 1; total, 6.

Septic sore throat was reported from: Boston, 10; Brookline, 1; Cambridge, 1; Haverhill, 1; Lynn, 1; Merrimac, 2; Milton, 1; North Adams, 1; Pittsfield, 1; total, 19.

Tetanus was reported from: Cambridge, 1; Kingston, 1; total, 2.

Trichinosis was reported from: Boston, 3; Fall River, 1; total, 4.

Typhoid fever was reported from: New Bedford, 1; South Hadley, 1; total, 2.

Undulant fever was reported from: Northampton, 1; Southbridge, 1; total, 2.

Weil's disease was reported from: Ware, 1; total, 1.

BOOK REVIEWS

Gastro-Enterology (three volumes). By Henry L. Bockus. Vol. II. *The Small and Large Intestine and Peritoneum: Diagnosis and Treatment of Disorders of the Small Intestine, Colon, Peritoneum, Mesentery and Omentum.* 4°, cloth, 975 pp., with 311 illustrations and 53 tables. Philadelphia and London: W. B. Saunders Company, 1944. $12.00.

This is an excellent book, half of which was written by Dr. Bockus and half by his colleagues in the Graduate Hospital of the University of Pennsylvania. It is easily the best textbook on the subject in English in the past twenty-five years, and fills a real need. The style is pleasing, and the book is well printed and bound and copiously illustrated. At the beginning of each chapter there is an index of contents, and a well-chosen list of references is supplied at the end. About one third of the book covers the small intestine, and nearly two thirds considers the large intestine, with the remainder — about fifty pages — on the peritoneum, mesentery and omentum. The material is so varied and extensive that it is hard to single out special chapters for review.

One has only to compare this volume with the standard textbooks of twenty years ago to note the great progress that has been made in the diagnosis and treatment of diseases of the intestine — the free use of the roentgen ray, the use of the Miller–Abbott tube in intestinal obstruction, the better classification of diarrheas, the complete description of ileitis, the use of vitamins, the medical treatment of megacolon, the absence of the usual hundred-page chapter on "intestinal intoxication," and the changes in operability and surgical mortality.

The radiographic illustrations are clear and easy to understand. The color films taken through the proctoscope are really remarkable. The value of examination of the feces is clearly shown. A fuller discussion of peritoneoscopy is promised in the third volume. The description of rectosigmoidoscopy is complete and satisfactory, as is the examination of the feces on an ordinary or a Schmidt test diet, and the use of barium enemas. The discussions of fluid and salt needs in patients with diarrhea, vomiting and gastrointestinal aspirations are valuable.

The chapter on intestinal obstruction is one of the largest in the book, modern methods of diagnosis and treatment being fully outlined. In the chapter on ileitis the whole subject is brought up to date and is especially well illustrated, and the symptoms and indications for medical and surgical treatment are clear. Mesenteric embolism and thrombosis seem to have been omitted in the differential diagnosis of the acute abdomen, and the value of the urinary diastase level in such cases should be stressed. In the chapter on intestinal carbohydrate dyspepsia, it is surprising that Schmidt and Strassburger, who named and first described the disease in 1901, are not mentioned.

Developmental anomalies of the colon — high and low cecum, redundant colon and so forth — are conservatively dealt with. Modern methods of medical and surgical treatment of megacolon are well outlined. The discussion of the etiology and treatment of one obscure disease, chronic ulcerative colitis, is especially good. The statement that symptoms are present in over 50 per cent of cases of noncomplicated diverticulosis of the intestine seems odd, and suggests that patients with diverticulums who have no gastrointestinal symptoms and no roentgenologic examination are not included. The chapters on tumors and granulomas of the bowel are excellent. Chronic appendicitis is treated conservatively.

Tuberculous peritonitis is given one page in contrast to the twenty pages of the older books, which probably corresponds to its lessened incidence.

This book can be highly recommended to the general practitioner and to the specialist.

Synopsis of Neuropsychiatry. By Lowell S. Selling, M.D., Ph.D., Dr.P.H. 12°, cloth, 500 pp. St. Louis: C. V. Mosby Company, 1944. $5.00.

The book is a simplified manual, well arranged and covering the whole field of neurology and psychiatry. The definitions are clear and concise, and the material is set out in an extremely attractive manner, so that a reference may be easily found. The book is obviously by an expert, with full knowledge of the physiology and pathology of the nervous system, as well as a complete grasp of the clinical aspects. In general, the volume is up to date, in spite of the rapid changes in many aspects of the subject in recent years. There is a good index, but no references to the literature. The book may safely be put in the hands of students, nurses and social workers, provided that they realize that some may differ from the author in the small technical points of a controversial nature.

NOTICES

GREATER BOSTON MEDICAL SOCIETY

A dinner meeting of the Greater Boston Medical Society will be held in the State Suite of the Copley Plaza on Tuesday, May 29, at 6:30 p.m. Dr. Ernst P. Boas, of New York, will speak on the subject "Medical Care in the Postwar Era."

BOSTON CITY HOSPITAL ALUMNI ASSOCIATION

There will be a clinical meeting of the Boston City Hospital Alumni Association on Saturday, May 26, at 10:30 a.m. in the Cheever Amphitheater, Dowling Building.

PROGRAM

The Use of Penicillin Aerosolization in the Treatment of Serious Respiratory Disease. Dr. Maurice S. Segal.
Strangulated Umbilical Hernia. Dr. William A. White, Jr.
Primary Cancer of the Lung. Dr. John W. Strieder.
Penicillin Therapy. Dr. Maxwell Finland.
Postwar Graduate Medical Training. Dr. Harold J. Jeghers.

Physicians and medical students are invited to attend.

Luncheon for the alumni, as guests of the trustees, will be held in the House Officers' Dining Room at 12:30 o'clock.

(*Notices continued on page xv*)